

The internal logic of thought

Psychology
Biology
Time

The Theory of MindTime explained

Part 2
Deep Dive

The MindTime Foundation

Updated 2024

Contents

Preface	2
Overview of the Theory of MindTime: A Revolutionary Approach	3
The Three Thinking Perspectives	4
Development of a Measure of Past, Present, and Future Thinking Perspectives	6
Key Findings	6
MindTime and the OCEAN model	8
Participants	8
Measures	8
Results	8
Regression Analyses	11
Conclusions	18
MindTime, Well-being, and Time-related Constructs	19
Participants	19
Measures	19
Results	19
Regression Analyses	23
Conclusions	31
Science Report References	32
Peer-Reviewed Publications - cited in over 133 instances	34
The Theory of MindTime	34
An Examination of Thinking Style Patterns as a Function of Thinking Perspective Profile	35
The Theory of MindTime and the Relationships between Thinking Perspective and the Big Five Personality Traits	36
The Theory of MindTime: The Relationships between Future, Past, and Present Thinking and Psychological Well-being and Distress	37
The Theory of MindTime: The Relationships between Thinking Perspective and Time Perspective	38
White Papers	39
A Critical Examination of the Differences between Past, Present, and Future Thinking Perspective with Past, Present, and Future Time Perspective and Time Orientation	39
A Critical Analysis of Zimbardo and Boyd's Time Perspective Inventory	54
Construct Explication: Imagining the Future versus Planning for the Future*	58

Preface

The trait approach to personality and human behavior is arguably the most dominant personality approach in psychology and one largely concerned with identifying the basic dimensions of personality required to provide a systematic account of individual differences (Boyle et al., 2008; Livesley & Jang, 2005). For the most part, researchers agree that personality involves a set of relatively stable traits that exist over time, are influenced by genetic factors, and correlate with different neurological pathways (Boyle et al., 2008; Stelmack & Rammsayer, 2008). However, several criticisms of trait theories have been expressed (see Boyle et al., 2008; Livesley & Jang, 2005; Livesley et al., 2003).

- First, trait theories are descriptive, not explanatory; they do not provide a priori explanations as to why specific personality traits exist. This is because trait-based taxonomies are derived from lexical analyses of adjectives and the psychometric identification of orthogonal sets of factors.
- Second, although the five-factor model of personality (e.g., Costa and McCrae, 1992a, 1992b) has generally been accepted as the most parsimonious of all personality taxonomies, there are still disagreements on how many distinct personality domains exist.
- Third, disagreements also exist in how the five-factor domains are defined and interpreted.
- Fourth, it is unclear as to the extent to which the different construct domains are orthogonal (i.e., separate and distinct from each other).
- Fifth, there is uncertainty regarding the extent to which lower-order traits define each domain and the orthogonality of these traits both within and between domains.
- Sixth, many five-factor models are used to predict human behavior in a variety of contexts, such as employee selection, targeted marketing, education, team effectiveness, organizational development, etc; but there is little understanding as to why those five-factors correlate with important outcome variables.
- Finally, most predictive models using the Big Five personality constructs usually examine only the correlations between those constructs and an outcome variable of interest. Most models do not examine the interactions among those constructs; nor do they take a profile approach when analyzing data.

There are also a few biology-based approaches to personality.

- See Eysenck (e.g., 1967, 1981, 1990); Gray (1970, 1982; 1987); Elliot and Thrash (2008); Watson & Clark (1984)

However, as Mathews (2008) discussed, the covariance observed among a variety of measures of traits, temperaments, and motivational patterns exists not just because individuals might differ in their sensitivity to the presence or absence of positively and negatively valiant stimuli, as *biological personality theorists would have it*, but also because individuals are '*tuned*' differently with respect to the mechanisms associated with attention, memory, information processing speed, and we add, *the innate and intuitive understanding of time*.

Overview of the Theory of MindTime: A Revolutionary Approach

The theory of MindTime, first proposed by John Furey in 1996, is the most parsimonious theory of human consciousness and psychology that exists today and is largely consistent with and draws upon theory and research from a variety of scientific domains.

- First, according to the theory, existing within all sentient beings, and human beings in particular, are three co-dependent temporally-based potentialities of consciousness, which we refer to as mind perspectives, and specifically as *Past mind*, *Present mind*, and *Future mind*. These potentialities correspond with innate representations of distinct temporal realities (past, present, future) and the symbolic and conceptual representations that emerge from those perceived realities.
 - See Tulving's work on Chronesthesia (Tulving, 2002a)
 - See Tulving's work on mental time travel (Tulving, 1985a, 1985b)
 - See also Clark (2011) and Stout (2008).
- Second, these mind perspectives provide the manner by which all biological organisms perceive and organize perceptual input into what is perceived as space/time reality (i.e., three dimensions of space and three dimensions of time: past, present, and future).
- Third, these mind perspectives represent specific evolutionary advancements of consciousness that provided evolving organisms with increasingly complex methods by which to enhance biological, reproductive, and in human beings, psychological, survival.
 - In human beings, these include advanced information processing systems as well as semantic and episodic memory, self-awareness, and the ability to engage in abstract and linguistic-based thought.
 - See Elliot and Thrash (2008) work on approach/avoidance motivation.
 - See King's work (2011; 2014) on the evolution of information processing.
 - See the work on mental time travel by Corballis and associates (Corballis, 2013a, 2013b; Suddendorf & Corballis, 2007a, 2007b).
 - See Piaget's work (1954, 1955) on subjective awareness of time and human development.
 - See Tulving's work on the development of self-awareness (2002b).
 - See Premack and Woodruff's (1978) work on the Theory of Mind.
 - See also Trope and Liberman's extensive work on Construal Level Theory (Liberman & Trope, 1998; Trope & Liberman, 2000, 2003, 2010).
- Fourth, these mind perspectives actualize in human beings as three distinct *and measurable* patterns of perceptual and cognitive mental activity, which we refer to as *Past*, *Present*, and *Future thinking*.

- Fifth, measurable variation exists in the extent to which human beings utilize their Past, Present, and Future thinking.
 - Moreover, the extent to which they do so, *in combination*, influences how individuals utilize (a) their semantic and episodic memory structures to encode, process, recall, and integrate information, (b) the personal narratives that individuals develop, the perceptual and social judgments (cognition) they make, (c) their goals, intentions, and preferences (motivation), (d) how they communicate and interact with others (i.e., their personality), (e) their temperamental, emotional, and affective dispositions, and (f) their cognitive, learning, and thinking styles.
 - In addition, each person's thinking perspective profile forms the foundation of a personal identity that is localized in, and inseparable from their subjective awareness of time; and which forms the basis for individuals' body-world-belief systems (see Stapp, 1996).
 - In summary, each individual can be described as having a thinking perspective profile that is the co-dependent combination of their Past, Present, and Future thinking.
- Sixth, not only does the theory of MindTime operate at the individual level but, it also operates at the collective level. That is, different cultures can be described as having their own thinking perspective profile.
- Finally, we propose that the theory of MindTime can be used to predict how individuals with different thinking style profiles resonate with any artifact of human ingenuity and thought (e.g., technology; art; music; products).

In summary, the theory of MindTime provides a foundation for understanding all of human perception, thought, and interaction, from the individual to the collective, and from the formation of an idea to the creation of cultures and artifacts based on those ideas.

The Three Thinking Perspectives

Past thinking refers to the perceptual and cognitive pattern of mental activity involving the innate and intuitive understanding of the past as a distinct temporal reality. In practice, Past thinking involves drawing upon past experiences and knowledge stored in memory to create certainty that decisions made today are good ones. Basically, Past thinking involves making sense of past experiences and knowledge through reflection and analysis.

Present thinking refers to the perceptual and cognitive pattern of mental activity involving the innate and intuitive understanding of the present as a distinct temporal reality. Present thinking involves the integration of both Past and Future thinking in order to increase the probability that today's actions will increase current and future survival. Past thinking involves creating harmony, equilibrium, and balance through the exercise of control, structure, and organization.

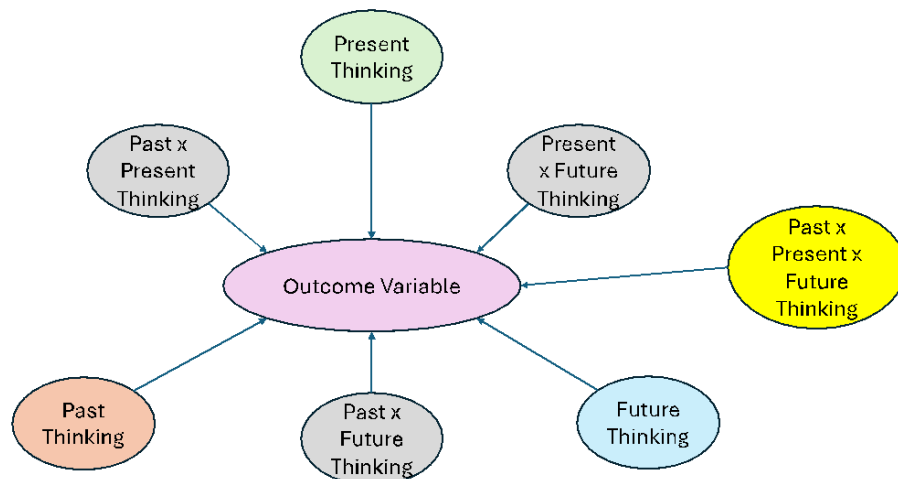
Future thinking refers to the perceptual and cognitive pattern of mental activity involving the innate and intuitive understanding of the future as a distinct temporal

reality. Future thinking is about imagining future possibilities. This perspective drives innovation, creativity, and change. Future thinking is visionary.

As we noted above, Past, Present, and Future thinking are co-dependent and interrelated thinking perspectives. As such, we advocate for taking a *profile* approach to understanding how Past, Present, and Future thinking combine both additively and interactively to affect human personality, behavior, and decision-making.

Below is a visual representation of the Theoretical and Empirical MindTime Model:

Theoretical and Empirical Model



Development of a Measure of Past, Present, and Future Thinking Perspectives

Early work in the development of a measure of Past, Present, and Future thinking began in 1997 by John Furey, later assisted by Dan Ariely.

Then, beginning in 2005, further development occurred with the collaboration of John Furey and Vincent Fortunato, leading to the development of the MindTime Profile Inventory (MTPI). Evidence for the construct validity of the MTPI was published by Fortunato and Furey (2009, 2010, 2011, and 2012).

The MTPI was recently revised (2024) and is now a 24-item instrument with 8 items each measuring Past, Present, and Future thinking, respectively.

To date, approximately 3500 people have completed the revised MTPI-R.

Evidence for the construct validity of the revised measure (MTPI-R) has recently been studied.

- **Study 1:** A comparison of Past, Present, and Future thinking with a measure of the five-factor model (which we'll abbreviate as OCEAN: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism).
- **Study 2:** A comparison of Past, Present, and Future thinking with measures of Resilience and Optimism as well as measures of time-related constructs: Polychronicity; Temporal Focus; and Pacing.

To date, approximately 3500 people have completed the MTPI-R.

Key Findings

- Past, Present, and Future thinking, in combination, explained statistically significant variance among all outcome variables in a manner consistent with the theory (See Table 1).
- Past, Present, and Future thinking interactively explained variance in all five personality constructs, indicating that specific personality traits can be explained by their MindTime thinking perspective profile.
- Present and Future thinking had the largest influences on well-being.
- Past, Present, and Future thinking each explained significant variance among the time-related constructs in ways consistent with the theory. All three types of thinking influenced how:
 - people orient themselves to the personal contents of their past, present, and future;
 - they engage with tasks (multitask or one task at a time);
 - they allocate their attention over time as they work toward task completion.

- Overall, women scored statistically significantly and slightly higher on Present thinking than men ($M_{\text{Women}} = 45.19$ vs $M_{\text{Men}} = 43.55$), whereas men scored statistically significantly and slightly higher and higher on Future thinking than women ($M_{\text{Men}} = 46.74$ vs $M_{\text{Women}} = 44.53$).
- Overall, men from the USA scored statistically significantly and slightly higher on both Past and Future thinking than men from Europe (Past thinking: $M_{\text{USA}} = 52.61$ vs $M_{\text{Europe}} = 48.98$; Future thinking: $M_{\text{USA}} = 46.99$ vs $M_{\text{Europe}} = 44.84$).

Table 1. *Variance Explained (R^2) by the combined influence of Past, Present, and Future thinking controlling for demographic variables*

Constructs	Adjusted R^2 (MindTime)	Adjusted ΔR^2 (Demographic Variables)	Total Adjusted R^2	% Total explained by MindTime
1. Openness	42.6% *	0.5%	43.1%	98.9%
2. Conscientiousness	66.1% *	1.0% *	67.1%	98.9%
3. Extraversion	30.0% *	1.8% *	31.8%	92.5%
4. Agreeableness	16.0% *	8.6% *	24.6%	68.4%
5. Neuroticism	13.0% *	6.2% *	19.2%	65.6%
6. Resilience	55.3% *	1.3% *	56.6%	97.7%
7. Optimism	30.6% *	4.3% *	34.9%	87.7%
8. Polychronicity	<u>5.2% *</u>	<u>7.2% *</u>	<u>12.4%</u>	<u>42.9%</u>
9. Past Temporal Focus	<u>13.2% *</u>	<u>1.1%</u>	<u>14.3%</u>	<u>92.3%</u>
10. Present Temporal Focus	<u>9.6% *</u>	<u>2.0%</u>	<u>11.6%</u>	<u>82.7%</u>
11. Future Temporal Focus	<u>25.4% *</u>	<u>2.9% *</u>	<u>28.3%</u>	<u>89.7%</u>
12. Deadline Pacing	<u>12.6% *</u>	<u>1.8%</u>	<u>14.4%</u>	<u>87.5%</u>
13. Steady Pacing	<u>15.1% *</u>	<u>0.8%</u>	<u>15.9%</u>	<u>94.5%</u>
14. U-Shaped Pacing	<u>6.5%</u>	<u>0.4%</u>	<u>6.9%</u>	<u>94.2%</u>

MindTime and the OCEAN model

Participants

- Gender distribution: 426 women, 283 men, 12 unspecified N = 721.
- Geographic distribution: Predominantly from Europe (262) and the USA (278) with smaller samples from Asia, Canada, Australia/New Zealand, Central/South America, the Middle East, and Africa.

Measures

- **MindTime:** Past, Present, and Future thinking were measured using the MindTime Profile Inventory – Revised (MTPI-R). The MTPI-R is a 24-item measure; 8-items each measuring Past, Present, and Future thinking.
- **OCEAN constructs:** The OCEAN constructs (Openness; Conscientiousness; Extraversion; Agreeableness; and Neuroticism) were measured using an open-sourced instrument downloaded from the International Personality Item Pool (<https://ipip.ori.org/index.htm>). Each construct was measured using 12 items, some of which were reverse-scored.

Results

Descriptive Statistics (See Table 2)

- Descriptive statistics, coefficient estimates of reliability, and correlation coefficients were computed for all constructs.
 - Past, Present, and Future thinking correlated with the OCEAN constructs as hypothesized.
 - Past thinking correlated positively with agreeableness, conscientiousness, and openness and negatively with Extraversion.
 - Present thinking correlated positively with extraversion, agreeableness, conscientiousness, and openness, and negatively with neuroticism.
 - Future thinking correlated positively with extraversion, agreeableness, conscientiousness, and openness, and negatively with neuroticism.

Table 2. Means (*M*), Standard Deviations, Reliability Estimates, and Correlation Coefficients from Study 1 (*N* = 721).

	Means	SDs	1	2	3	4	5	6	7	8
1. Past	57.53 ⁺	23.74 ⁺	(.849) ⁺							
2. Present	56.85 ⁺	20.67 ⁺	.464 [*]	(.903) ⁺						
3. Future	54.71 ⁺	21.98 ⁺	.143 [*]	.346 [*]	(.872) ⁺					
4. Openness	69.25	13.43	.257 ^{**}	.120 [*]	.597 [*]	(.749)				
5. Conscientiousness	60.89	16.87	.491 [*]	.801 [*]	.241 [*]	.144 [*]	(.835)			
6. Extraversion	48.03	20.17	-.151 [*]	.187 ^{**}	.478 [*]	.230 [*]	.096 [*]	(.891)		
7. Agreeableness	66.14	16.04	.137 ^{**}	.263 ^{**}	.374 [*]	.404 [*]	.286 [*]	.396 [*]	(.852)	
8. Neuroticism	51.66	19.22	.086 [*]	-.246 [*]	-.217 [*]	-.004	-.271 [*]	-.231 [*]	-.176 [*]	(.888)

* $p < .05$

⁺ Means and SDs for Past, Present, and Future thinking were computed using normalized data from the entire population of individuals who have taken the MTPI-R to date.

^{**} Coefficient alpha estimates for Past, Present, and Future thinking were computed from the entire population of individuals who have taken the MTPI-R to date.

Note: Coefficient alpha estimates of reliability are in parentheses on the diagonal. ⁺Computed from the entire

Sex Differences

Independent Group *t*-tests were computed for all variables.

● MindTime Constructs

- Men and Women did not differ statistically significantly (in this sample) on Past ($M_{Women} = 59.32$ vs $M_{Men} = 57.25$), Present ($M_{Women} = 61.17$ vs $M_{Men} = 58.35$), or Future thinking ($M_{Women} = 55.52$ vs $M_{Men} = 55.89$).
 - [Note: Women scored statistically significantly higher on Present thinking ($M_{Women} = 60.21$) than men ($M_{Men} = 55.39$) among all those who have completed the MTPI-R to date.]

● OCEAN Constructs

- The only statistically significant differences were for Agreeableness and Neuroticism.
- Women scored higher on both Agreeableness ($M = 68.94$) and Neuroticism ($M = 54.54$) than men ($M_A = 61.12$; $M_N = 47.25$).

Geographic Location Differences

Independent Group *t*-tests were computed to test for differences between individuals from Europe versus the USA.

- **MindTime Constructs**

- Participants from Europe and the USA did not differ statistically significantly (in this sample) on Past ($M_{Europe} = 57.59$ vs $M_{USA} = 59.24$), Present ($M_{Europe} = 60.67$ vs $M_{USA} = 61.69$), or Future thinking ($M_{Europe} = 56.00$ vs $M_{USA} = 54.90$).
 - [Note: Participants from the USA scored statistically significantly higher on Past thinking ($M_{USA} = 59.34$) than participants from Europe ($M_{Europe} = 56.85$) among all those who have completed the MTPI-R to date.]

- **OCEAN Constructs**

- The only statistically significant difference was for Agreeableness. Participants from Europe scored higher on Agreeableness ($M_{Europe} = 68.75$) than participants from the USA ($M_{USA} = 66.09$).

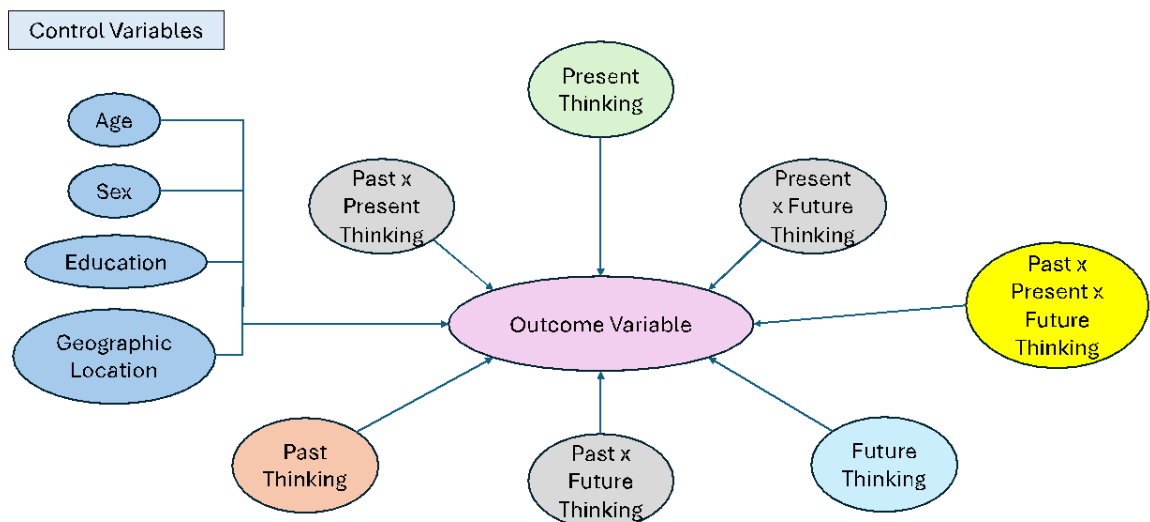
Age

- Age correlated positively and statistically significantly with Present thinking ($r = .21$) and Future thinking ($r = .10$). As people tend to age, their Present and Future thinking increases.
 - [Note: Age correlated positively and statistically significantly with Past thinking ($r = .05$), Present thinking ($r = .11$), and Future thinking ($r = .08$) among those who have completed the MTPI-R to date.]
- Age correlated positively and statistically significantly with Conscientiousness ($r = .18$), Extraversion ($r = .13$), and Agreeableness ($r = .25$), and negatively with Neuroticism ($r = -.23$). As people age, they become more conscientious, more Extraverted, more agreeable, and more emotionally stable.

Regression Analyses

- Regression analyses were computed on all constructs.
 - Seven predictor variables were entered into each equation: Past thinking; Present thinking; Future thinking; Past*Present thinking; Past*Future thinking; Present*Future thinking; and finally, Past* Present*Future thinking (see the figure of the Theoretical and Empirical Model [above]).
 - After the regression equations were derived, values +/- 1 standard deviation (SD) were input into the equations to visually present the combined influence of Past, Present, and Future thinking on each outcome variable. Eight categories of individuals were created as follows:
 - Low integrated: -1 SD on Past, Present, and Future thinking.
 - Past thinker: +1 SD on Past thinking; -1 SD on Present and Future thinking
 - Present thinker: +1 SD on Present thinking; -1 SD on Past and Future thinking
 - Future thinker: +1 SD on Future thinking; -1 SD on Past and Present thinking
 - Past/Present thinker: +1 SD on Past and Present thinking; -1 SD on Future thinking
 - Past/Future thinker: +1 SD on Past and Future thinking; -1 SD on Present thinking
 - Present/Future thinker: +1 SD on Present and Future thinking; -1 SD on Past thinking
 - High Integrated: +1 SD on Past, Present, and Future thinking.

Theoretical and Measurement Model

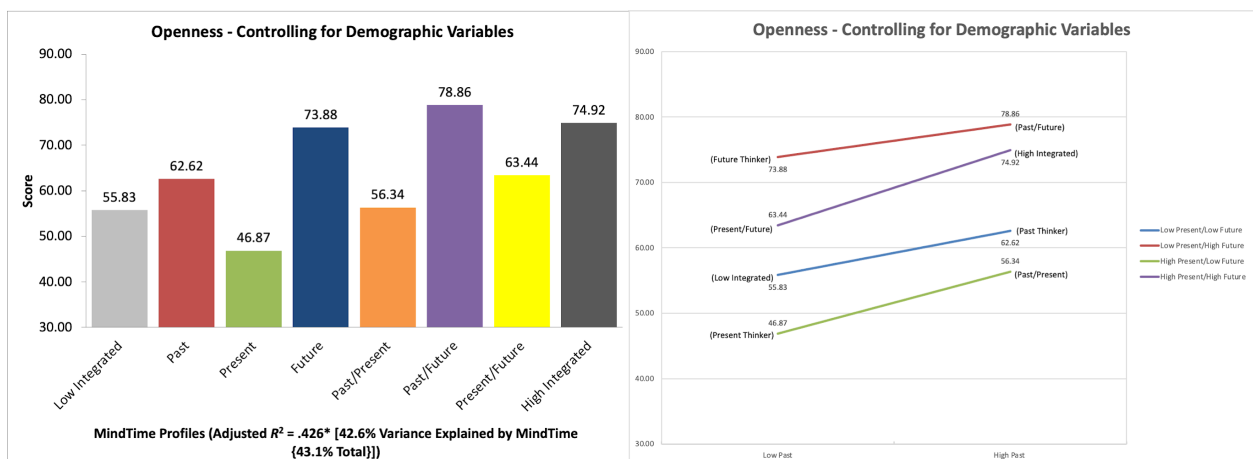


Regression Results - OCEAN

- **All models are statistically significant.**

Bar Chart* and Line Graphs depicting the combined influence of Past, Present, and Future thinking on the OCEAN variables, controlling for the demographic variables of age, sex, geographic location, and education.*

Openness



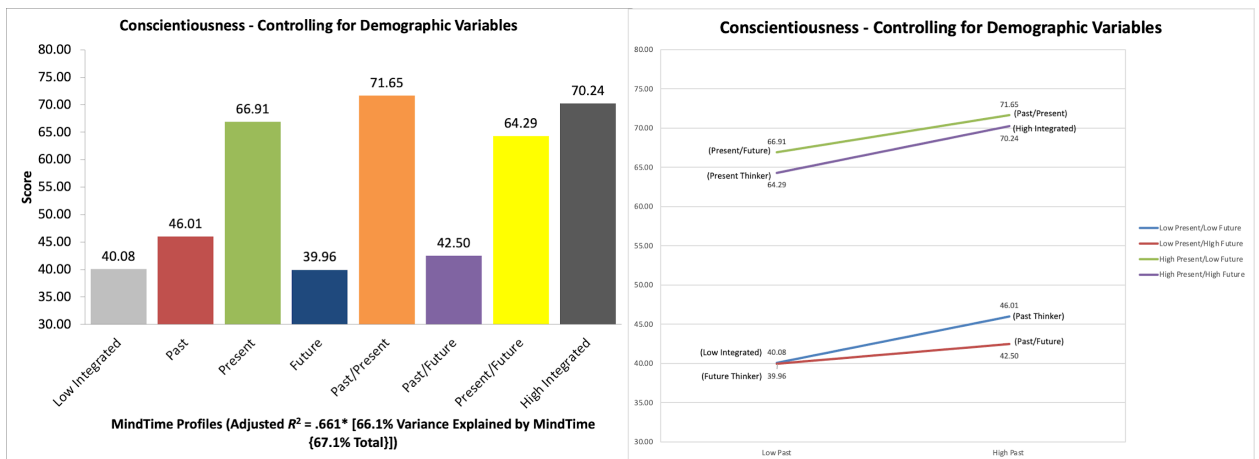
* Prototypical Response Patterns of MindTime Profiles based on imputing scores +/- 1 SD above and below the mean.

Summary of Results

• Openness

- Future thinking had the strongest positive influence on Openness followed by Past thinking, whereas Present thinking had a negative influence on Openness.
 - Openness was highest for Past/Future thinkers, followed by Future and High Integrated thinkers
 - Openness was lowest for Present thinkers, followed by Low Integrated, then Past/Present thinkers.
- These findings are consistent with the theory: Openness to new experiences is largely the domain of Future thinking; but is also influenced by the natural curiosity and reflective tendencies of Past thinking. Present thinking tends to inhibit Openness.

Conscientiousness



Summary of Results

- **Conscientiousness**

- Present thinking had the strongest positive influence on Conscientiousness followed by Past thinking.
 - Conscientiousness was highest for Past/Present, High Integrated, and Present thinkers.
 - Conscientiousness was lowest for Future, Past/Future, Low Integrated, and Past thinkers.
- These findings are consistent with the theory: Conscientiousness is largely a characteristic of Present thinking; but it is also influenced by Past thinking.

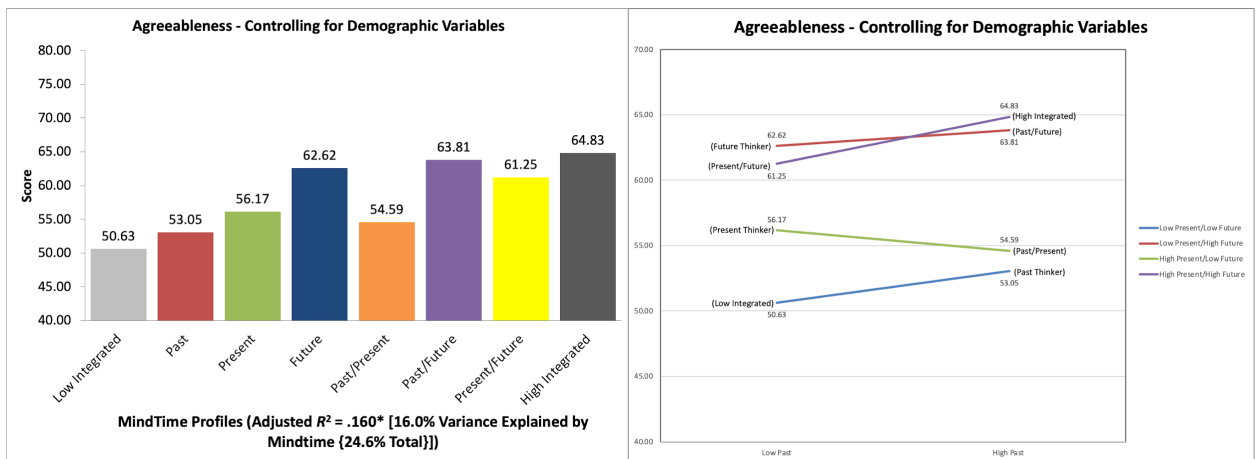
Extraversion

Summary of Results

- **Extraversion**

- Future thinking had the strongest positive influence on Extraversion, followed by a moderate influence on Present thinking. Past thinking had a strong negative influence on Extraversion.
 - Extraversion was highest for Present/Future thinkers, followed by Future thinkers, then Present thinkers.
 - Extraversion was lowest for Past thinkers, followed by Past/Present thinkers, then Past/Future thinkers.
- These findings are consistent with the theory: Future thinking is largely an outgoing, forward-looking cognitive and perceptual process, whereas Past thinkers tend to be introverted.

Agreeableness

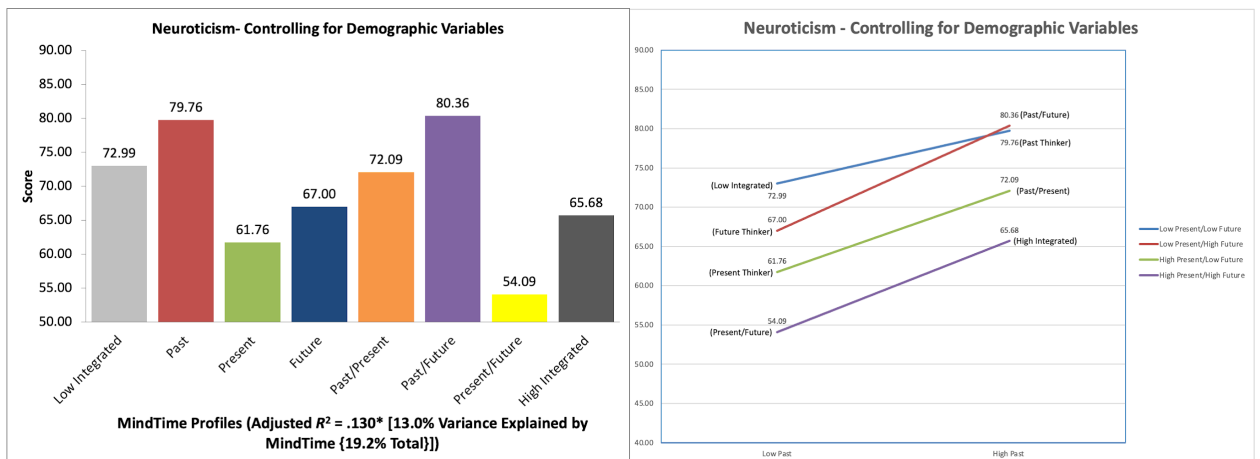


Summary of Results

- **Agreeableness**

- Future thinking had the strongest positive influence on Agreeableness, followed by a small positive influence of Present thinking.
 - Agreeableness was highest for High Integrated thinkers, followed by Past/Future, Future, and Present/Future thinkers,
 - Agreeableness was lowest for Low Integrated, Past, Past/Present, and Present thinkers. It is the absence of Future thinking that tends to inhibit Agreeableness.
- Similar to previous findings, these results are consistent with the theory.

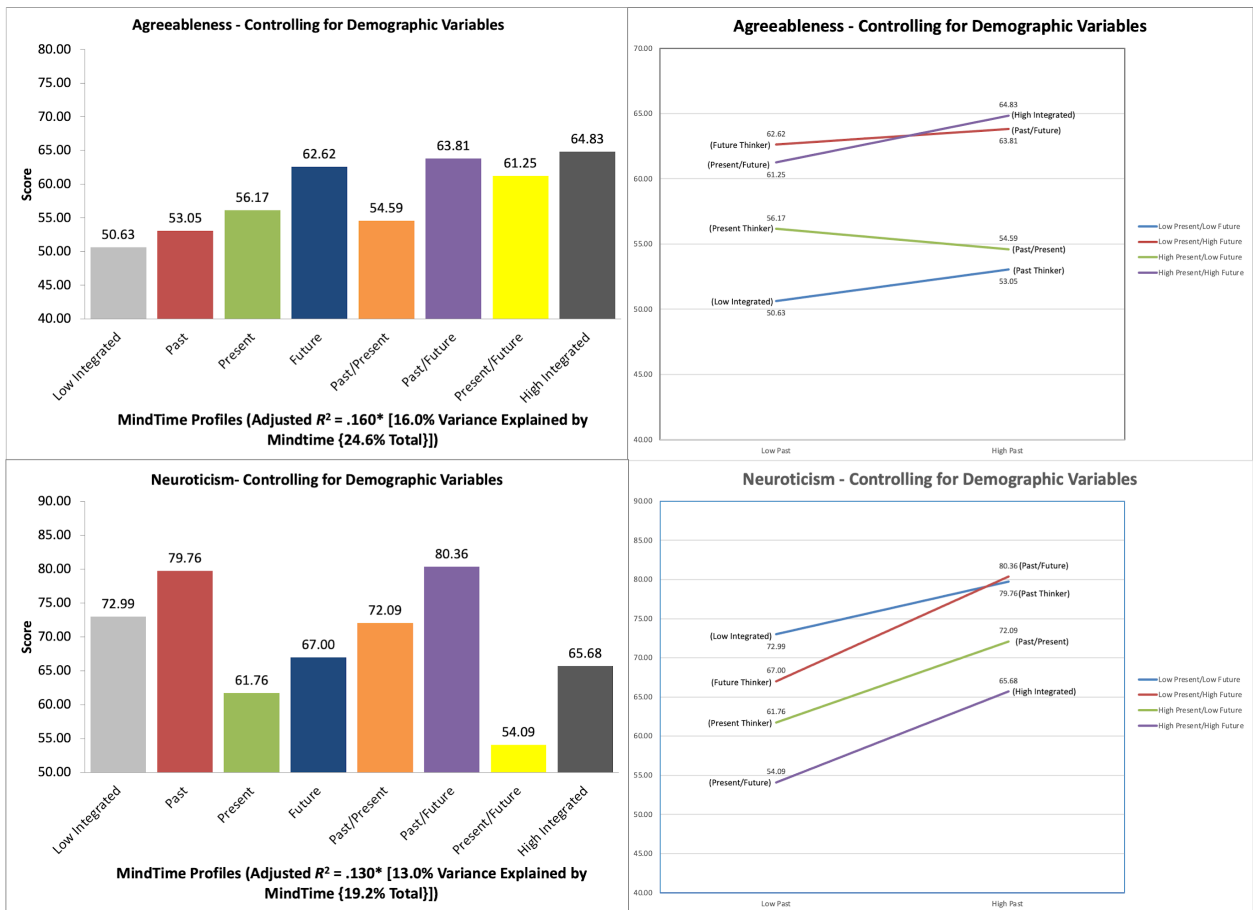
Neuroticism



Summary of Results

- **Neuroticism**

- Past thinking had the strongest positive influence on Neuroticism (i.e., high scores on Past thinking led to high scores on Neuroticism). Conversely, both Present and Future thinking had negative influences on Neuroticism (i.e., high scores on Present and Future thinking led to low scores on Neuroticism).
 - Neuroticism was highest for Past/Future thinkers and Past thinkers, followed by Low Integrated thinkers. Interestingly, the presence of Past thinking seemed to negate the positive influence of Future thinking on Neuroticism. Instead, Future thinkers along with Past/Future thinkers tended to be the least emotionally stable profiles.
 - Conversely, Neuroticism was lowest for Present/Future thinkers, followed by Present thinkers, then Future thinkers. Individuals with high scores on in Present thinking tended to be the most emotionally stable, except when accompanied by Past thinking.
- Similar to previous findings, these findings are consistent with the theory.



* Prototypical Response Patterns of MindTime Profiles based on imputing scores +/- 1 SD above and below the mean.

Conclusions

- Our findings indicate that the OCEAN Trait-Based Personality constructs are strongly influenced by the manner in which individuals perceive and process the world around them.
 - Future thinking, which is focused on future possibilities, and is creative and innovative, is the dominant thinking perspective that influenced Openness, Extraversion, and Agreeableness.
 - Past thinking, which is focused on reflecting on past experiences and knowledge stored in memory is the dominant thinking pattern that influenced the opposite of Extraversion: Introversion
 - Present thinking, which is focused on integrating the cognitive products of Past and Future thinking and making sure things get done, was shown to be the dominant thinking pattern of Conscientiousness. Present thinking was also an important component of Conscientiousness.
 - However, it is important to note that all three thinking perspectives influenced all five personality constructs, but in different ways.
 - Past thinking also positively influenced Openness and Conscientiousness.
 - Present thinking also positively influenced Extraversion and Agreeableness, and negatively influenced Openness.
 - Future thinking also negatively influenced Neuroticism (i.e., Future thinking correlated with emotional stability)
 - It is also important to note that each of the thinking perspectives moderated the relationships between the other thinking perspectives and the different personality traits. Two- and three-way interactions among the three constructs were observed among the five personality traits.
 - Finally, these findings are largely consistent with those published by Fortunato and Furey (2009), which examined how an early version of the MindTime Profile Inventory correlated with the OCEAN constructs.

MindTime, Well-being, and Time-related Constructs

Participants

- Gender distribution: 240 women, 162 men, 11 unspecified. N = 413.
- Geographic distribution: Predominantly from Europe (149) and the USA (131), with smaller samples from Asia, Canada, Australia/New Zealand, Central/South America, the Middle East, and Africa.

Measures

- **MindTime:** Past, Present, and Future thinking were measured using the MindTime Profile Inventory – Revised (MTPI-R). The MTPI-R is a 24-item measure; 8-items each measuring Past, Present, and Future thinking.
- **Well-being:** Resilience was measured using Neill and Daus' (2001) 15-item measure. Optimism was measured using Scheier and Carver's (1985) 6-item measure.
- **Time Constructs:** Participants also completed three time-related measures: Polychronicity (Conte and Jacob), Temporal Focus (Shipp et al., 2009) (Past Focus; Present Focus; Future Focus), and Pacing (Gevers et al., 2015) (Deadline Pacing, Steady Pacing; U-Shaped Pacing).

Results

Descriptive statistics (See Table 3)

- Descriptive statistics, coefficient estimates of reliability, and correlation coefficients were computed for all constructs.
 - Past, Present, and Future thinking correlated with the Well-being and Time-related constructs as hypothesized.
 - Past thinking correlated *positively* with Resilience, Past Temporal Focus, Present Temporal Focus, Future Temporal Focus, and Steady Pacing, and *negatively* with Polychronicity.
 - Present thinking correlated *positively* with Resilience, Optimism, Present Temporal Focus, Future Temporal Focus, and Steady Pacing, and *negatively* with Deadline Pacing and U-Shaped Pacing
 - Future thinking correlated *positively* with Resilience, Optimism, Polychronicity, Present Temporal Focus, Future Temporal Focus, and Steady Pacing.

Table 3. Means (*M*), Standard Deviations (*SDs*), Reliability Estimates, and Correlation Coefficients from Study 2 (*N* = 413).

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Past Thinking	57.53 ⁺	23.74 ⁺	(.849) ⁺											
2. Present Thinking	56.85 ⁺	20.67 ⁺	.449*	(.903) ⁺										
3. Future Thinking	54.71 ⁺	21.98 ⁺	.160*	.292*	(.872) ⁺									
4. Resilience	66.82	17.89	.250*	.608*	.572*	(.912)								
5. Optimism	52.22	20.62	-0.029	.359*	.451*	.639*	(.786)							
6. Polychronicity	41.74	18.72	-.177*	-0.086	.142*	-0.045	0.038	(.711)						
7. Past Temporal Focus	68.85	22.18	.280*	-0.054	-0.07	-.157*	-.319*	-.113*	(.831)					
8. Present Temporal Focus	60.21	18.69	.200*	.265*	.201*	.460*	.300*	-.118*	0.006	(.682)				
9. Future Temporal Focus	68.77	19.70	.328*	.374*	.376*	.470*	.264*	-0.074	.127*	.244*	(.803)			
10. Deadline Pacing	58.44	26.32	0.037	-.309*	-0.061	-.190*	-.114*	.104*	.211*	-0.061	-0.045	(.807)		
11. Steady Pacing	47.05	23.18	.314*	.357*	.138*	.252*	0.095	-.180*	.106*	.261*	.262*	-.257*	(.719)	
12. U-Shaped Pacing	61.92	23.32	0.096	-.118*	0.092	0.011	-0.047	-0.007	.128*	.097*	.107*	.430**	.075	(.774)

* $p < .05$

⁺ Means and SDs for Past, Present, and Future thinking were computed using normalized data from the entire population of individuals who have taken the MTPI-R to date.

⁺⁺ Coefficient alpha estimates for Past, Present, and Future thinking were computed from the entire population of individuals who have taken the MTPI-R to date.

Note: Coefficient alpha estimates of reliability are in parentheses on the diagonal. ⁺Computed from the entire

Sex Differences

Independent Group *t*-tests were computed for all variables. The only statistically significant differences were for Agreeableness and Neuroticism.

- **MindTime Constructs**

- Men and Women differed statistically significantly (in this sample) on Past ($M_{Women} = 61.01$ vs $M_{Men} = 56.01$) and Present thinking ($M_{Women} = 62.58$ vs $M_{Men} = 55.47$). They did not differ on Future thinking ($M_{Women} = 55.56$ vs $M_{Men} = 56.82$).
 - [Note: Women scored statistically significantly higher on Present thinking ($M_{Women} = 60.50$) than men ($M_{Men} = 55.60$) among all those who have completed the MTPI-R to date].

- **Well-being and Time-Related Constructs**

- Women scored higher than men on Optimism ($M_{Women} = 53.82$ vs $M_{Men} = 50.21$) and Polychronicity ($M_{Women} = 45.25$ vs $M_{Men} = 36.60$).

Geographic Location Differences

Independent Group *t*-tests were computed to test for differences between individuals from Europe versus the USA.

- **MindTime Constructs**

- Statistically significant differences were observed for Resilience, Optimism, Polychronicity, Temporal Focus Present, and Temporal Focus Past.
- Participants from Europe and the USA did not differ statistically significantly (in this sample) on Past ($M_{Europe} = 60.12$ vs $M_{USA} = 27.24$) or Present ($M_{Europe} = 59.04$ vs $M_{USA} = 59.93$). The difference on Future thinking approached traditional levels of statistical significance ($M_{Europe} = 53.37$ vs $M_{USA} = 57.76$), $p = .056$.
 - [Note: Participants from the USA scored statistically significantly higher on Past thinking ($M_{USA} = 59.34$) than participants from Europe ($M_{Europe} = 56.85$) among all those who have completed the MTPI-R to date.]

- **Well-being and Time-Related Constructs**

- Participants from the USA scored statistically significantly higher than participants from Europe on Resilience ($M_{USA} = 69.47$ vs $M_{Europe} = 64.20$), Optimism ($M_{USA} = 55.24$ vs $M_{Europe} = 47.40$), Temporal Focus Present ($M_{USA} = 63.19$ vs $M_{Europe} = 56.70$), and Temporal Focus Future ($M_{USA} = 70.27$ vs $M_{Europe} = 66.29$)
- Participants from Europe scored statistically significantly higher than participants from the USA on Polychronicity ($M_{Europe} = 45.13$ vs $M_{USA} = 40.39$).

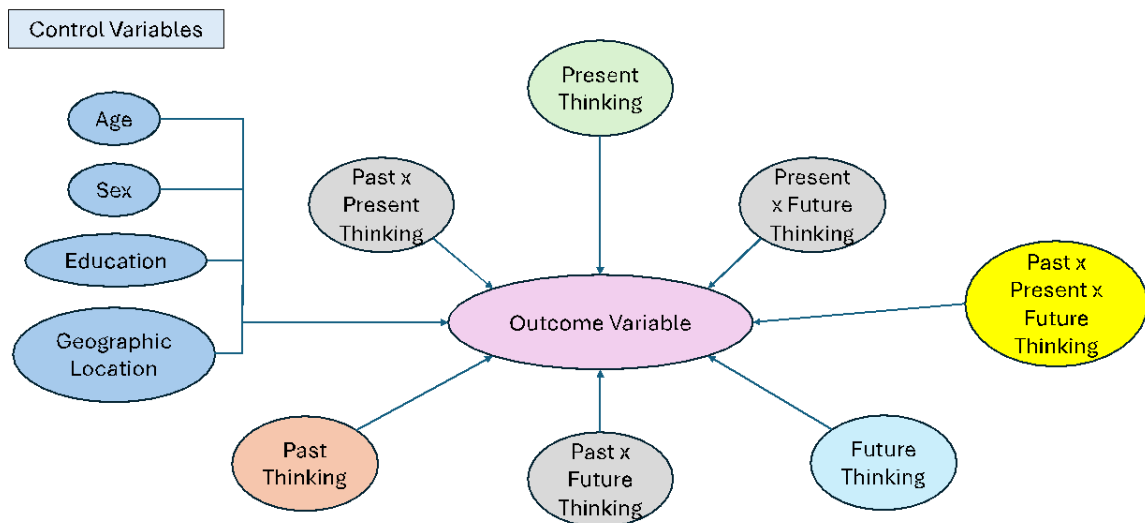
Age

- Age correlated *positively* and statistically significantly with Present thinking ($r = .19$) and Future thinking ($r = .18$). As people tend to age, their Present and Future thinking increases.
 - [Note: Age correlated *positively* and statistically significantly with Past thinking ($r = .05$), Present thinking ($r = .11$), and Future thinking ($r = .08$) among those who have completed the MTPI-R to date.]
- Age correlated *positively* and statistically significantly with Resilience ($r = .19$), Optimism ($r = .16$), Polychronicity ($r = .11$), and Steady Pacing ($r = .11$).
- Age correlated negatively and statistically significantly with Temporal Focus Past ($r = -.17$) and Deadline Pacing ($r = -.14$).
- As people age, they tend to get more resilient and optimistic and tend to prefer to multitask more and pace themselves on tasks. Conversely, they also tend not to focus on the contents of their past or wait until deadlines approach to complete a task.

Regression Analyses

- Regression analyses were computed on all constructs.
 - Seven predictor variables were entered into each equation: Past thinking; Present thinking; Future thinking; Past x Present thinking; Past x Future thinking; Present x Future thinking; and finally, Past x Present x Future thinking (see the figure of the Theoretical and Empirical Model [above]).
 - After the regression equations were derived, values +/- 1 standard deviation (SD) were input into the equations to visually present the combined influence of Past, Present, and Future thinking on each outcome variable. Eight categories of individuals were created as follows:
 - Low integrated: -1 SD on Past, Present, and Future thinking.
 - Past thinker: +1 SD on Past thinking; -1 SD on Present and Future thinking
 - Present thinker: +1 SD on Present thinking; -1 SD on Past and Future thinking
 - Future thinker: +1 SD on Future thinking; -1 SD on Past and Present thinking
 - Past/Present thinker: +1 SD on Past and Present thinking; -1 SD on Future thinking
 - Past/Future thinker: +1 SD on Past and Future thinking; -1 SD on Present thinking
 - Present/Future thinker: +1 SD on Present and Future thinking; -1 SD on Past thinking
 - High Integrated: +1 SD on Past, Present, and Future thinking.

Theoretical and Measurement Model

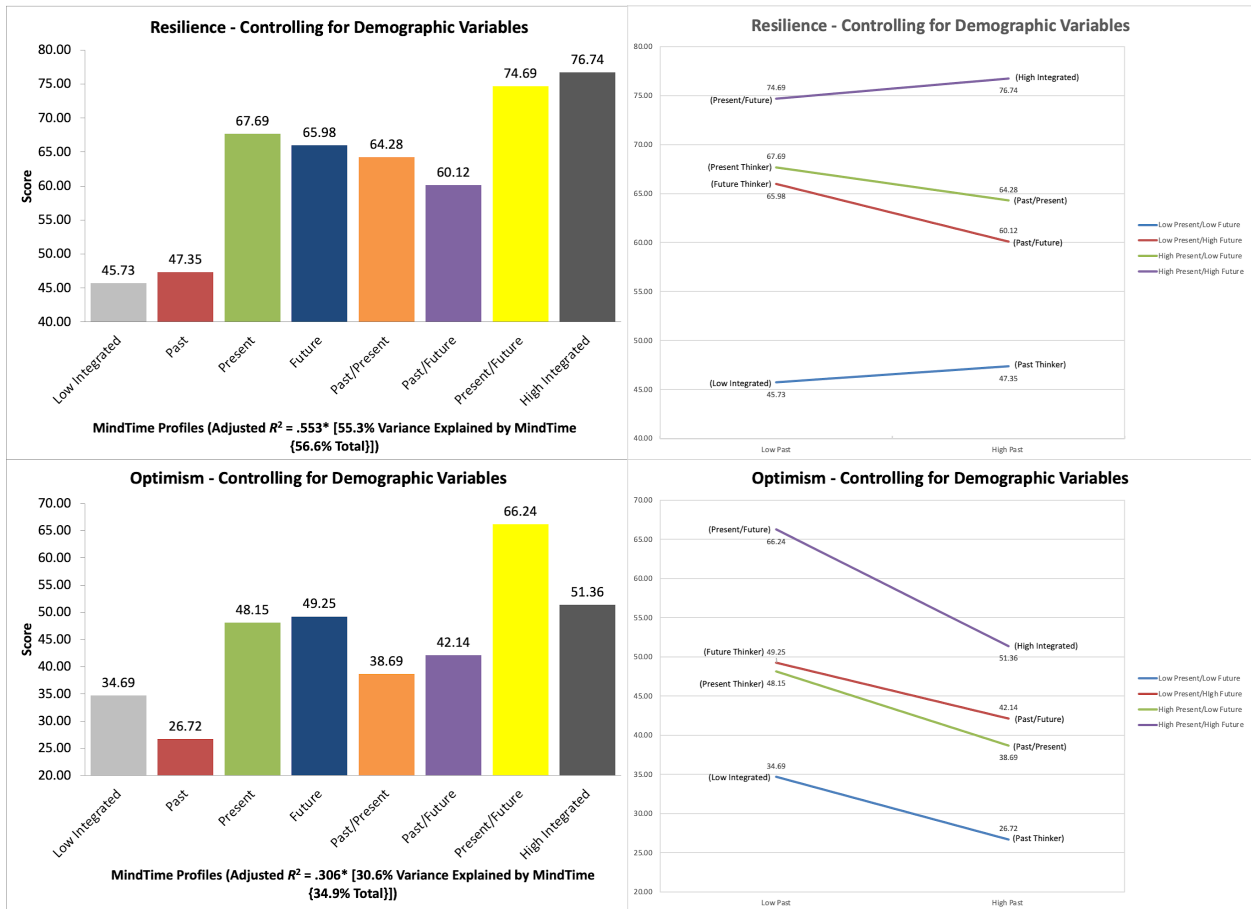


Regression Results– Well-being and Time-related Constructs

- All models are statistically significant.

Bar Chart* and Line Graphs depicting the combined influence of Past, Present, and Future thinking on the well-being and time-related constructs, controlling for the demographic variables of age, sex, geographic location and education.*

Well-Being



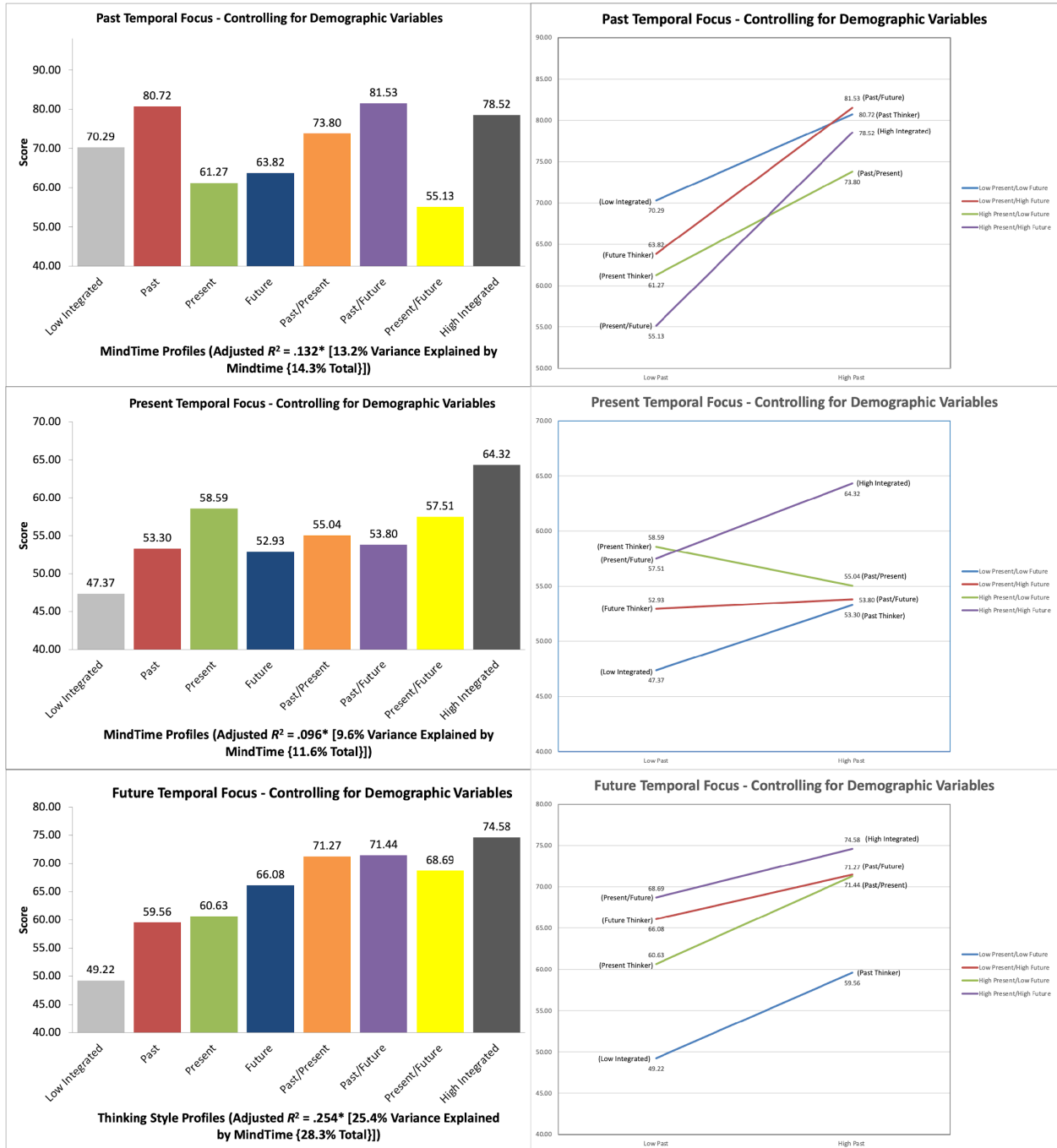
* Prototypical Response Patterns of MindTime Profiles based on imputing scores +/- 1 SD above and below the mean.

Summary of Results: Well-being

- **Resilience**
 - Present and Future thinking both had about equal influence on Resilience.
 - However, all of the interactions were statistically significant indicating that the influence of each thinking perspective was moderated by the scores on the other thinking perspectives.
 - Resilience was highest for High Integrated and Present/Future thinkers.
 - Resilience was lowest for Low Integrated and Past thinkers.
 - Although Present and Future thinking had the largest influence on Resilience, for individuals with low scores on Present and Future thinking (Low Integrated) and individuals with high scores on Present and Future thinking (High Integrated), the addition of high scores on Past thinking (Past) had a positive influence on Resilience, whereas for individuals with low scores on either Present or Future thinking (combined with high scores on the other, Past thinking attenuated scores on Resilience.

- **Optimism**
 - Both Present and Future thinking had about an equal positive influence on Optimism, whereas Past thinking had a negative influence on Optimism.
 - None of the interactions were statistically significant, indicating that the influence of Past (-), Present (+), and Future (+) thinking was additive, not interactive.
 - Optimism was highest for Present/Future thinkers, and lowest for Past thinkers.
 - High scores on Past thinking attenuated scores on Optimism regardless of their scores on Present or Future thinking.

Temporal Focus

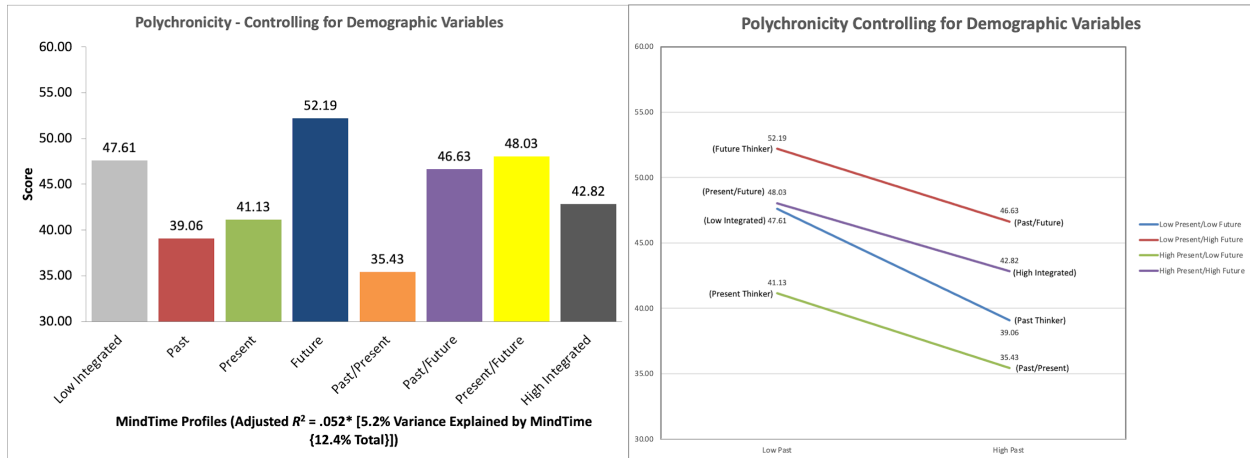


* Prototypical Response Patterns of MindTime Profiles based on imputing scores +/- 1 SD above and below the mean.

Summary of Results: Temporal Focus

- **Temporal Focus:** the extent to which individuals focus their attention on the contents of their personal past, present, and/or future.
 - **Past Temporal Focus:** Past thinking had the strongest (and positive) relationship with Past Temporal Focus, whereas Present thinking had a moderate negative influence on Past Temporal Focus.
 - The presence of Past thinking accentuated individuals' focus on the contents of the past, even when accompanied by Present or Future thinking.
 - Past and Past/Future thinkers tended to focus most on the contents of their personal past, whereas Present/Future, Present, and Future thinkers tended to focus least on the contents of their personal past.
 - **Present Temporal Focus:** All three thinking perspectives had positive influences on Present Temporal Focus.
 - This finding demonstrates that Past, Present, and Future thinking are all oriented around current circumstances.
 - This finding is consistent with the theory of MindTime.
 - High Integrated thinkers tended to focus the most and Low Integrated thinkers tended to focus the least on the contents of their personal present.
 - **Future Temporal Focus:** All three thinking perspectives had positive influences on Future Temporal Focus.
 - Consistent with the theory, these findings demonstrate that Past, Present, and Future thinking all are oriented, not only around current circumstances (see above), but also to Future personal circumstances.
 - High Integrated thinkers, followed by Past/Future, Past/Present, and Present/Future thinkers all tended to focus on their personal futures, whereas Low Integrated thinkers, followed by Past thinkers tended to focus the least on their personal futures.
 - These results are consistent with the theory of MindTime. Although Past thinkers were most likely to focus on the contents of their personal past, these findings indicate that all three thinking perspectives (Past, Present, and Future thinking) are oriented toward both the present and the future. According to the theory, this is because all three thinking perspectives are oriented toward maximizing current and future biological, reproductive, and psychological survival.

Work Habits: Polychronicity (multitasking)

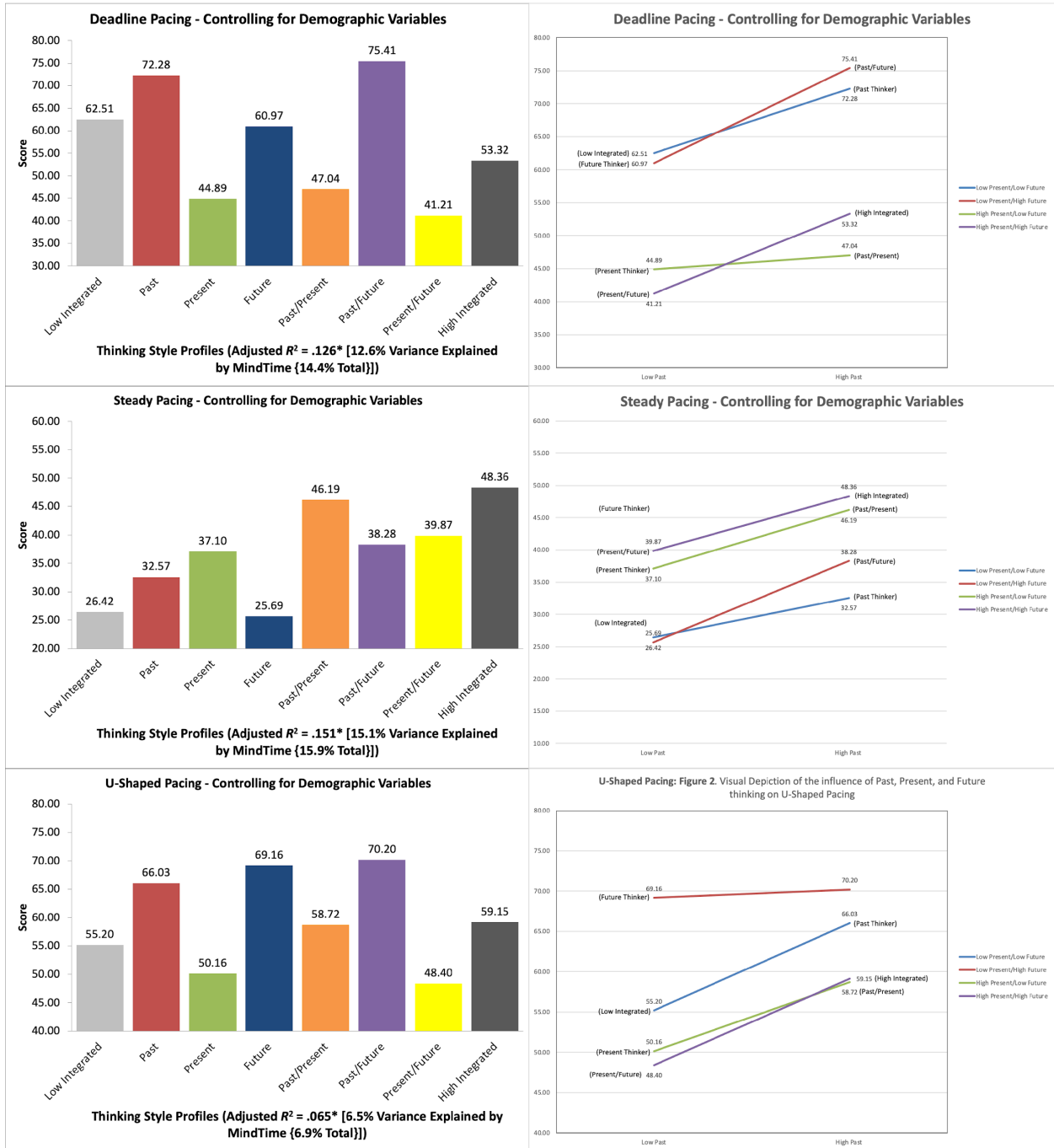


* Prototypical Response Patterns of MindTime Profiles based on imputing scores +/- 1 SD above and below the mean.

Summary of Results: Polychronicity

- **Polychronicity:** High scores indicate a preference for multi-tasking vs completing one task at a time.
 - Future thinking had a positive influence on Polychronicity, whereas Past thinking had a negative influence on Polychronicity, indicating that as a person's Future thinking increased, their tendency to prefer multi-tasking also increased. Present thinking had a slight negative (but not statistically significant) influence on Polychronicity.
 - Polychronicity was highest for Future thinkers and lowest for Past and Past/Present thinkers.

Work Habits: Pacing



Summary of Results: Pacing

- **Pacing:** the manner to which individuals pace themselves when needing to complete a task with a deadline.
 - **Deadline Pacing:** Past thinking related positively with deadline pacing, whereas Present related negatively with Deadline Pacing.
 - People high in Present thinking (Present, Past/Present, Present/Future, and High Integrated thinkers) did not like to wait until a deadline approached in order to engage with the task, whereas conversely, Past thinkers and Past/Future thinkers, followed by Future thinkers, indicated a tendency to wait until a deadline approached before completing a task, largely because both Past, Future, and Past/Future thinkers are those who score low on Present thinking.
 - **Steady Pacing:** Both Present and Past thinking had positive influences on Steady Pacing.
 - This finding is consistent with the above (Deadline Pacing) insofar that individuals high in Present thinking (Present, Past/Present, and High Integrated thinkers) all tended to prefer spacing their work out over the lifetime of a task.
 - Individuals with high Past thinking scores combined with high scores on Present also tended to prefer to work steadily on a task.
 - Conversely, Future thinkers along with Past thinkers (no Present thinking) indicated a tendency not to steadily pace their work.
 - This is consistent with the findings of Deadline Pacing, in which both Past and Future thinkers tended to procrastinate. It is the influence of Present thinking that largely accounts for pacing one's attention evenly throughout the task.
 - **U-Shaped Pacing:** both Past and Future thinking related positively with U-Shaped Pacing, whereas Present thinking had a negative influence on U-Shaped Pacing.
 - Past thinkers, Future thinkers, and Past/Future thinkers all indicated the tendency to work hard at the beginning of a task, slack off during the middle of a task, and then pick up the work pace again as the deadline approached.
 - These finding are consistent with the findings of Deadline Pacing.
 - The negative influence of Present thinking on U-Shaped Pacing is consistent with the findings of Steady Pacing: Individuals with high Present thinking scores tend prefer to work steadily on a task.
 - **Interpretation.** It is the influence of Present thinking that appears to mitigate the tendencies of Past thinking and Future thinking or work hard on tasks early, procrastinate during the middle of a timeframe, and then

work hard again as the deadline for task completion approaches. Instead, the presence of Present thinking leads individuals to work steadily throughout the time frame of a task.

Conclusions

Our findings indicate that Past, Present, and Future thinking explained statistically significant variance among all of the constructs examined in Study 2.

- Well-being was largely a function of Present and Future thinking.
- The extent to which a person directs their attention to their personal past, present, and future were largely influenced by their Past, Present, and Future thinking.
- Past thinking had the strongest positive relationship with Past Temporal Focus
- All three thinking perspectives related positively with Present Temporal Focus
- All three thinking perspectives related positively with Future Temporal Focus
 - These results are consistent with the theory of MindTime. Although Past thinkers were most likely to focus on the contents of their personal past, these findings indicate that all three thinking perspectives (Past, Present, and Future thinking) are oriented toward both the present and the future. According to the theory, this is because all three thinking perspectives are oriented toward maximizing current and future biological, reproductive, and psychological survival.

Past, Present, and Future thinking explained statistically significant variance among the time-related work habit variables in a manner consistent with the theory.

- **Polychronicity:** The tendency to multi-task was largely a function of both Future thinking, whereas the tendency to focus on one task at a time was largely influenced by Past thinking.
- **Pacing:** Past, Present, and Future thinking influenced the timing of when individuals tend to focus their attention on a task when given a deadline depended.
 - Present thinking related positively with *Steady Pacing*.
 - Past thinking related positively with both *Deadline Pacing* and *U-Shaped Pacing*.
 - Future thinking, like Past thinking, also related positively with *U-Shaped Pacing*.

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The Theory of MindTime

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Cosmology, 2014, Vol. 18, pp.119-130

Abstract

According to modern cosmologists, the evolution of consciousness corresponded with the evolution of matter into increasingly complex, elaborate, and interactive systems, with the human brain providing the highest level of complexity known. Psychological research shows that just about all of human experience is dependent upon and influenced by how individuals perceive time, localize themselves consciously within space and time, process their temporally- based perceptions and experiences, and utilize their episodic and semantic memory structures to engage in mental time travel.

We propose that over the course of evolution, sensitivities toward perceiving potentially pleasurable/appetitive and aversive/harmful environmental stimuli and the motivation to approach and/or avoid such stimuli moved beyond reflexive, innate, and learned associative neural networks and became increasingly influenced by, and in turn influenced, the cognitive structures associated with organisms' ability to perceive and conceptualize time. In this paper, we present a theory of consciousness and psychology in which we propose that three general yet distinct cognitive patterns, or thinking perspectives, exist, which we refer to as Past, Present, and Future thinking, and that these three patterns are universal conditions of consciousness and form the foundation and framework for understanding, in particular, all of human thought and interaction, from the individual to the collective, and from the formation of an idea to the creation of cultures and artifacts based on those ideas.

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An Examination of Thinking Style Patterns as a Function of Thinking Perspective Profile

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Personality and Individual Differences, 2012, Vol. 53, pp.849–856

Abstract

According to the theory of MindTime, the ability of human beings to dissociate from the present moment and engage in mental time travel gave rise to the development of three distinct thinking perspectives: Past, Present, and Future thinking, and the extent to which individuals utilize the three thinking perspectives, in combination, influences the types of task environments they prefer. In this study, we took a profile approach and examined the extent to which individuals manifest different patterns of thinking styles based on their thinking perspective profile. Six hundred and eighty-three graduate students enrolled in an online university participated in the study.

Results supported our hypothesis: all univariate tests using profile as the grouping variable were statistically significant. Moreover, the pattern of statistically significant post hoc tests shows that individuals manifested different patterns of thinking styles depending on their thinking perspective profile. Our findings show the importance of taking a holistic approach when examining the combined influence Past, Present, and Future thinking on outcome variables of interest.

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The Theory of MindTime and the Relationships between Thinking Perspective and the Big Five Personality Traits

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Personality and Individual Differences, 2009, Vol. 47, pp.241–246

Abstract

This manuscript introduces a theory of individual differences based on the arguably unique ability of human beings to engage in mental time travel (Suddendorf & Corballis, 1997). The Theory of MindTime posits that the ability to engage in mental time travel gave rise to the development of three distinct patterns of thinking: Past thinking, Future thinking, and Present thinking, and that measurable individual differences exist in the extent to which each of the three thinking perspectives are utilized.

In this manuscript, we present an overview of the theory and examine the construct validity of a three dimensional measure of thinking based on the theory by examining relationships between scores on this measure with scores on Costa & McCrae's (1992) Five-Factor Inventory (FFI). Data were collected from 819 undergraduate students (59.6% female; 83.3% Caucasian). In general, the results supported our hypotheses that Future, Past, and Present thinking would differentially relate to scores on subscales of the FFI.

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[Full paper](#)

The Theory of MindTime: The Relationships between Future, Past, and Present Thinking and Psychological Well-being and Distress

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Personality and Individual Differences, 2011, Vol. 50, pp.20–24

Abstract

Based on recent advances in cognitive and comparative psychology, we posit that the arguably unique human ability to decouple primary mental representations from the present moment and place them into different temporal localities (i.e., form secondary mental representations of objects) as well as the ability to form higher-order mental representations of secondary representations (meta-representations) gave rise to the development of three distinct patterns of thinking: Future thinking, Past thinking, and Present thinking. Moreover, we posit that measurable individual differences exist in the extent to which each of the three thinking perspectives are utilized and that such differences influence the manifestation and expression of personality and well-being.

In this study, five hundred eighty participants completed the TimeStyle Inventory and measures of resiliency, optimism, cynicism, anxiety, and depression. Our results indicated that Future, Past, and Present thinking correlated as hypothesized and shared unique variance with the dependent variables. Our findings support the theory of MindTime and have implications for personality theory and stress research.

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The Theory of MindTime: The Relationships between Thinking Perspective and Time Perspective

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Personality and Individual Differences, 2010, Vol. 48, pp.436–441

Abstract

According to the Theory of MindTime (Fortunato & Furey, 2009; Furey, 1994; Furey & Stevens, 2004), (a) three distinct patterns of thinking – Past thinking, Present thinking, and Future thinking – evolved in concert with the ability of Homo Sapiens to engage in mental time travel (e.g. Suddendorf & Corballis, 1997) and (b) measurable individual differences exist in the extent to which people utilize the three thinking perspectives. In this manuscript, we compare and contrast the three thinking perspectives with the constructs of time perspective and time orientation.

In addition, we examine the construct validity of scores on a three-dimensional measure of thinking perspective – the TimeStyle Inventory – with scores on Zimbardo and Boyd's (1999) Time Perspective Inventory. Data were collected from 813 undergraduate students. In summary, our findings provide support for the conceptual distinction between the two constructs as well as the construct validity of scores on the TimeStyle Inventory.

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White Papers

A Critical Examination of the Differences between Past, Present, and Future Thinking Perspective with Past, Present, and Future Time Perspective and Time Orientation

Vincent J. Fortunato and John T. Furey
The MindTime Foundation

Author Notes

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"We live in the present: in other words, our behavior is a function of everything which determines it here and now. But these present activations are constantly referring us to what has already passed away or to what has not yet come to be...our actions at any given moment do not only depend on the situation in which we find ourselves at that instant but also on everything we have already experienced and on all our future expectations, ...each of our actions takes place in a temporal perspective, it depends on our temporal horizon at the precise moment of its occurrence... [T]he future only unfolds in so far as we imagine a future which seems to be realizable...there is no future without at the same time a desire for something else and awareness of the possibility of realizing it."(Fraisie, 1963, pps 151 and 174).

Overview

In this white paper, we briefly compare and contrast our three thinking perspectives with two similar constructs: time perspective and time orientation. We start by briefly summarizing the theory of MindTime. Next, we define the constructs of time perspective and time orientation. We then briefly compare these two constructs with those of temporal perspective. Finally, we compare the constructs of time perspective and time orientation within the context of our theory of MindTime.

The Theory of MindTime

We have proposed (Fortunato & Furey, 2009, 2010, 2011, 2012; Furey & Fortunato, 2014) that existing in all sentient beings, and human beings in particular, are three broad temporally-based potentialities of consciousness which we refer to generally as mind perspectives, and specifically as Past mind, Present mind, and Future mind, respectively. These three potentialities of consciousness correspond with innate representations of the past, present, and future as distinct temporal realities, and the symbolic and conceptual representations and qualia (i.e., qualities: Marshall, 1909; Stout, 2008; qualis-consciousness: Clark, 2011) that emerge from those perceived realities. We argued that the potentialities of Past mind, Present mind, and Future mind exist in all biological organisms and are actualized through the neural networks and mechanisms by which organisms perceive space-time reality (King, 2011). Specifically, we said that the potentialities of Past mind, Present mind, and Future mind are the results of specific evolutionary advancements of consciousness that provided evolving organisms with increasingly complex methods by which to approach positively valent stimuli and avoid negatively valent stimuli. In human beings, these information processing systems include semantic and episodic memory systems, self-awareness, the subjective perception of time, and mental time travel.

Second, we have proposed that variation exists in the extent to which individual organisms, and human beings in particular, through their innate, unconscious,

and/or conscious motivational intentions and beliefs, manifest into reality the potentialities of Past mind, Present mind, and Future mind. Moreover, the extent to which they do so form three codependent and measurable patterns of perceptual and cognitive mental activity by which individual organisms, particularly human beings, (a) perceive the world around them, (b) process and encode information, and (c) mentally represent objects of consciousness. We refer to these measurable patterns as Past thinking, Present thinking, and Future thinking, which, we argue, influence the perceptual and social judgments and decisions individuals make (cognition), their goals, intentions, and preferences (motivation), their temperamental, emotional, and affective dispositions, and how they communicate and interact with others (e.g., their personality). We also said that how individuals utilize their Past, Present, and Future thinking, in combination (i.e., their thinking perspective profile) forms the foundation of a personal identity (i.e., an I) that is localized in, and inseparable from, subjective awareness of time and which forms the basis for what Stapp (1996) referred to as individuals' body-world-belief systems. And in a reciprocal feedback loop, these body-world-belief schemas operate as conscious and unconscious perceptual/cognitive filters that reinforce how individuals utilize their information processing and memory systems to minimize risks and approach perceived opportunities. In summary, we claimed that Past, Present, and Future thinking mediate the interactive influence and activation of biologically-based approach and avoidance motivational systems and information processing systems with the manifestation of a variety of both state- and trait-level individual difference variables.

In general, Past thinking refers to the general perceptual, cognitive, and motivational pattern involving a temporal orientation toward the past (in the form of personal and collective memories as well as stored information), sense-making, and the motivation to avoid negatively valent stimuli; Future thinking refers to the general perceptual, cognitive, and motivational pattern involving a temporal orientation toward the future, the imagination of future possibilities, and the motivation to approach positively valent stimuli; and Present thinking refers to the general pattern of perceptual, cognitive, and motivational pattern oriented toward imposing cognitive and behavioral control mechanisms, such as plans, structures, processes, rules, and schemas, on the environment in order to facilitate current and future survival.

Third, we have claimed that the theory of MindTime is universal in scope and fractal in nature and can be used to describe and explain the behaviors of increasingly aggregated higher-order and complex collections of individuals such as groups and work teams, organizations, and nations as well as the temporal origins of the cultural artifacts created by these aggregates. Thus, not only do the potentialities of Past, Present, and Future mind exist at the individual level, but they also operate at the collective level as collective patterns of perceptual, cognitive, and motivational activity that form the basis for the development of group cultures and the cultural norms, expectations, and artifacts adopted and created by those groups.

Finally, we said that the degree to which any one individual or collection of individuals resonates with any other individual or collection of individuals or with any artifact or product of human endeavor (e.g., culture, political and economic system[s], institution[s], technology, language, symbol[s], message[s], manufactured object[s], architecture, design[s]) will depend on the degree of congruence that exists between the thinking perspective characteristics of the subject and that of the object. That is, the theory of MindTime provides a basis for understanding and predicting the quality and nature of the interaction between any two individuals or groups of individuals as well as the quality and nature of the interactions among the members of any collective.

In summary, the theory of MindTime provides a foundation for understanding all of human perception, thought, and interaction, from the individual to the collective, and from the formation of an idea to the creation of cultures and artifacts based on those ideas. It is our view that the physical, cognitive, social, and cultural achievements of human beings have occurred precisely because of the actualization, manifestation, interaction, and entanglement of Past, Present, and Future mind in subjective time as three distinct patterns of thinking, which in turn allowed for ever-increasing levels of abstraction in human beings' understanding of the world and the language used to conceptualize, symbolize, and communicate that understanding with others.

Time Perspective and Time Orientation

Although Frank (1939) is often credited with being the first to define the construct of time perspective (see Lens, 1986), it was Lewin (1935) who proposed that the behavior of an individual at what is considered to be the present moment is influenced by a cognitive awareness of their personal past as well as that of an anticipated, albeit imaginary, future, an awareness that he later called time perspective (1942). According to Lewin (1942, 1951), time perspective is "the totality of the individual's views of his psychological future and psychological past existing at a given time" (Lewin, 1951, p. 75). Time perspective has also been defined as the degree to which one reflects upon their personal past, is centered in the present, or anticipates their personal future (Lennings, 2000); as the "composite cognitive structures that characterize the way an individual projects, collects, accesses, values, and organizes events that reside in distinct temporal loci" (Lasane & O'Donnell, 2005, p. 12); as a person's cognitive understanding of the relationships between events that are localized in the past, present, and future (Seijts, 1998); and as "the often nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories, or time frames, that help to give order, coherence, and meaning to those events...They are used in encoding, storing, and recalling experienced events, as well as in forming expectations, goals, contingencies, and imaginative scenarios" (Zimbardo & Boyd, 1999, p. 1271-1272).

Similarly, time orientation has been defined as an individual's dominant or preferred orientation toward the past, present, or future, (e.g., de Volder, 1979; Gjesme, 1983;

Lens, 1986; Nuttin, 1985); as the behavioral by-product of the cognitive processes that results in a distinct pattern of responding to objects, events, and situations that implicate a distinct temporal space [that manifests as] a behavioral predisposition to be more likely influenced by thoughts, emotions, and motivations for a distinct region of time” (Lasane & O’Donnell, 2005, p. 14); and as the cognitive, motivational, and emotional processes involved in anticipating, planning, and regulating behavior (Nurmi, 2005). Note that many researchers tend to use the terms time perspective and time orientation interchangeably (e.g., Agaawal & Tripathi, 1978; Kastenbaum, 1961; Lasane & O’Donnell, 2005; Seijts, 1998; Wallace, 1956).

Unfortunately, there has been much conceptual and empirical confusion surrounding both constructs. First, although it has been noted that time orientation represents a more circumspect construct than time perspective (Lasane & O’Donnell, 2005), there has been much agreement that both terms have been used interchangeably (see, for example, Agaawal & Tripathi, 1978; Kastenbaum, 1961; Lasane & O’Donnell, 2005; Seijts, 1998; Wallace, 1956). Indeed, even as far back as 1956, Wallace (p.1) indicated that: “Concepts such as time sense, time orientation, time perspective, and time perception are employed interchangeably, often in the same investigation, or are utilized in such a manner that no clear idea of the intended meaning is given, either in conceptual or operational terms.”

Second, with one recent and notable exception (Zimbardo & Boyd, 1999), there has been a trend in the literature to limit the “totality” (Lewin, 1942) of an individual’s life space to the extent to which they are temporally oriented to the future (i.e., future time perspective and future time orientation). Future time perspective has been defined as (a) the overall importance a person attaches to the future (Lewin, 1942); (b) “the length of the future time span over which one conceptualizes personalized future events” (Wallace, 1956, p. 240); (c) a general concern for future events (Kastenbaum, 1961); (d) the extent to which the future is perceived as predictable, structured, and controllable (Rakowski, 1986; Lessing, 1972); and (e) the perceived instrumentality of current behavior for desired future states (Nuttin, 1985). Even Lewin (1942) referred to future time perspective as the overall importance a person attaches to the future. Conversely, future time orientation has been defined as (a) a general capacity to anticipate, shed light on and structure the future (Gjesme, 1983) and (b) the cognitive, motivational, and emotional processes involved in anticipating, planning, and regulation of behavior so as to predict one’s own development (Nurmi, 2005).

However, as with time perspective and time orientation, two terms - future time perspective and future time orientation - have been defined similarly and used interchangeably. Individuals are thought to have a future time perspective and/or orientation when they are able to conceptualize and/or orient their cognitive and behavioral patterns toward pre-conceived outcomes, are able to delay immediate gratification in pursuit of goals (Seijts, 1998) ,and are concerned with the instrumentalities and future consequences of their actions. Future time perspective and orientation are often operationalized using self-report measures examining the

degree to which individuals consider the instrumentality of current behavior in terms of goal attainment and future consequences, by the specific number of goals individuals set over a particular time period, by the number of personal events individuals believe will occur in their lifetime, and by the number of future events people think about (Seijts, 1998). Relatedly, researchers have invariably confounded the constructs of episodic future thinking and semantic prospection, which we've discussed earlier, with that of future time perspective (e.g., Atance, 1988; Atance & Meltzoff, 2007; Zimbardo & Boyd, 1999).

In contrast to future time perspective, present time perspective refers to the extent to which an individual is unconcerned with the future or future consequences (e.g., de Volder, 1979; Lens, 1986; Nurmi, 2005; Nuttin, 1985) and engages in hedonistic behavior (i.e., an attachment to and/or focus on immediate physiological and sensory gratification accompanied by a lack of goal setting, planning, or concern with future consequences (e.g., Zimbardo & Boyd, 1999). Present time perspective and orientation are often inferred by low scores on measures of future time perspective or by high scores on measures of hedonistic behavior (Seijts, 1998).

Third, there has been a lack of consensus as to whether time perspective (and time orientation) is uni-dimensional or multi-dimensional. One approach has been to view time perspective/orientation as multidimensional, consisting of the following characteristics: extension, direction, content, density, valence (affect), and structural coherence (de Volder, 1979, Lasane & O'Donnell, 2005; Seijts, 1998; Wallace, 1956). Extension refers to the length of the time span that future is conceptualized (Seijts, 1998); Density refers to the number of thoughts or relative concentration of cognitions that reside in one's personal future (Lasane & O'Donnell, 2005); Direction refers to the extent to which someone perceives themselves as moving forward from the present moment into the future; Content refers to that actual thoughts and objects that are contained in the past (in the form of memories), present (in the form of experiences), and future (in the form of expectancies) (Lasane & O'Donnell, 2005); Valence (or affect) refers to the subjective evaluation of the various time frames and the extent to which someone is gratified or pleased with the events that have occurred in the past, are occurring in the present, or are anticipated to occur in the future (Lasane & O'Donnell, 2005; Seijts, 1988); and structural organization (coherence) refers to the underlying conceptual schemata that link events within and between the temporal frames.

The second approach views time perspective/orientation as a uni-dimensional construct with an orientation toward the distant future and an orientation toward the present moment being two ends of one conceptual pole (e.g., Gjesme, 1975, 1981; Lens, 1986; Nuttin, 1985). Consequently, individuals are thought to have a future time perspective/orientation when they are able to conceptualize and/or orient their cognitive and behavioral patterns toward pre-conceived long-term outcomes and are able to delay immediate gratification. In other words, individuals who appear to have a strong future time perspective/orientation are those who consider the instrumentality of current behavior in terms of goal attainment and future

consequences. Actions taken at what is viewed as the 'present' moment are all taken with a mental eye toward fulfilling a future goal, often at the expense of personal enjoyment. Future orientation, therefore, embraces the expectations, hopes, and fears people have (content), how far into the future such expectations and hopes are projected (extension), how people think about the factors that influence their future (control beliefs, anticipated causal attributions), how people feel about the future (optimism, pessimism), and the kinds of tools they have developed to attain their goals (Nurmi, 1991, 2005).

Conversely, individuals are thought to have a short-term view of the future (i.e., a present time perspective/orientation) when they disregard the long-term consequences of their actions and instead focus on satisfying immediate impulses. Note that the uni-dimensional approach to time perspective/orientation completely disregards the possibility of individuals having a past time perspective/orientation. Regardless, in both conceptualizations—multi-dimensional and uni-dimensional—the content of one's thoughts, whether measured by density, number, or valence of anticipated events, in the first case, or an anticipation of future goals and consequences in the second case, became the focus of all the subsequent measurement systems (e.g., Seijts, 1998).

The lack of conceptual differentiation among the four constructs as well as a lack of understanding regarding the dimensionality of the constructs has also led to a fourth problem – the expansion of the operational definitions of time perspective/orientation and future time perspective/orientation to include the motivational and behavioral consequences that were hypothesized to follow from them (e.g., De Volder & Lens, 1982, Nuttin, 1985). As Seijts (1998) discussed, measures of future time perspective/orientation have consisted of both subjective and objective measures that attempt to measure (a) the number of events people believe will occur in his or her lifetime (Kastenbaum, 1961, Wallace, 1956); (b) the number of future items someone had thought about during the past 2 weeks (Eson, 1951, Roos & Albers, 1965, Strumpt, 1987); (c) goal planning (e.g., Gonzalez & Zimbardo, 1985); and (d) the number of goals that are set across a particular time period (Nuttin, 1985). Thus, those who score highly on such measures are thought to have a future time presentation/orientation, whereas those who score low on such measures are thought to have a present time perspective/orientation, the assumption is that such individuals are oriented toward satisfying immediate physiological and sensory desires accompanied by a lack of goal setting, planning, or concern with future consequences (Zimbardo & Boyd, 1999).

In summary, many conceptual and empirical problems have been identified with respect to the time perspective/time orientation literature making comparisons between time perspective/orientation and the three thinking perspectives difficult. However, to facilitate such a comparison, we have adopted definitions of (future) time perspective and (future) time orientation that we believe are most consistent with the original formulations of both constructs (Frank, 1939, Lewin, 1931, 1942; deVolder, 1979; Wallace, 1956). Specifically, we view time perspective as the extent

to which a person is able to conceptualize the temporal frames of past, present, and future as well as the extent to which s/he identifies with and is influenced by the contents of their personal past and/or future. Conversely, we view time orientation as one's preferred orientation toward the future, past, or present. Thus, a person's time perspective allows for the combined influence of the contents of a person's historical past, anticipated future, and present events on their personal psychology or "life space" (Lewin, 1942), whereas a person's time orientation is limited to the temporal space that appears to have the most influence on a person's psychology.

Time Perspective Versus Temporal Perspective

In contrast with the above, Liberman and Trope (1998; Trope & Liberman, 2003, 2010), in their Construal Level Theory, used the constructs' temporal perspective to denote the direction in which an object of consciousness is temporally located. Similarly, temporal distance is used to denote the perceived temporal proximity to the present moment of an object or event. Similarly, temporal distance is used to denote the perceived temporal proximity to the present moment of an object or event. According to Liberman and Trope, a person's attention can be directed toward the distal future (distal future temporal perspective), the near-term (present temporal perspective), or the past (past temporal perspective). Liberman and Trope's research has focused on examining the extent to which temporal perspective and temporal distance influence the level of abstraction with which individuals mentally represent objects. Their research has shown that individuals with near-term temporal perspective are those who mentally represent objects concretely, form proximal rather than distal goals, focus their efforts on the means of obtaining those goals, and perform better on analytical, rather than creative tasks. Conversely, individuals with a distal temporal perspective are those who mentally represent objects and events abstractly, perform better on creative tasks rather than analytical tasks and form idealized rather than specific goals. Thus, by referring to future temporal perspective or near-term (present) temporal perspective, Liberman and Trope were referring to the direction and distance of objects from the present moment, not the psychological identification with the contents of one's personalized future or one's historical past.

Note, however, that there is no correspondence between individuals with a present time perspective and individuals with either a distal or near-term temporal perspective: the former individuals are usually defined by a lack of time perspective as manifested by the disregard of the consequences of their actions. Interestingly, Trope and Liberman (2003) found that individuals with a distal future temporal perspective tended to focus on the desirability of outcomes rather than on the feasibility of such outcomes, whereas individuals with a present temporal perspective tended to focus on the feasibility, rather than the desirability, of outcomes when making decisions.

Temporal Perspective versus Thinking Perspective. Note that the pattern of perceptual/cognitive mental activities that are observed when individuals are asked to adopt a past temporal perspective are similar to those that occur naturally in organisms as part of the domain of Past thinking; the pattern of perceptual/cognitive mental and behavioral activities that are observed when individuals are asked to adopt a near-term temporal perspective are similar to those that occur naturally in organisms as part of the domain of Present thinking; and the pattern of perceptual/cognitive mental and behavioral activities that are observed when individuals are asked to adopt a distal future temporal perspective are similar to those that occur naturally in organisms as part of the domain of Future thinking.

Thus, for the sake of clarity, we posit that the terms temporal perspective and time perspective should be limited in their use to denote the temporal direction of objects of consciousness, such as into the future or into the past. Consequently, temporal (time) perspective has two key attributes: direction and extension (Lasane & O'Donnell, 2005; Seijts, 1998). Conversely, we argue that researchers should use the construct of time orientation, not time perspective, to refer to an individual's dominant or preferred psychological orientation toward the past, present, or future. Whereas time (temporal) perspective has the attributes of direction and extension, time orientation consists of several attributes (Lasane & O'Donnell, 2005; Seijts, 1998): direction (past or future); content (the actual thoughts that are contained in the past [in the form of memories] the present [in the form of current experiences] and the future [in the form of expectancies and predetermined future outcome]); density (the relative concentration of cognitions that reside one's personal past and/or future); valence (the subjective evaluation of the contents associated with one's personal past and/or future); and structural coherence (the underlying conceptual schemata that link events within and between the temporal frames).

Thinking Perspective versus Time Perspective: Differentiating the Constructs

As we have discussed above, time perspective and time orientation refer to individuals' psychological identification with their own personal past, present, and future. Past, Present, and Future thinking refer to specific and measurable patterns of perceptual and cognitive activity based on how individuals are oriented toward subjective time and utilize their episodic and semantic memory systems to process, encode, store, and retrieve information systems by which to develop strategies to ensure biological and social survival. Thus, the three thinking perspectives are not defined by the same characteristics that define time perspective and time orientation, such as the (a) actual content or objects of one's thoughts, (b) the density or valence of such thoughts, (c) number, pattern, or coherence of the content that fills each of the temporal frames, or (d) affective tone of such content. Instead, Past, Present, and Future thinking refer to the broad range of perceptual and cognitive mental activities that occur when organisms interact with their internal and external environment.

Future Thinking and Future Time Perspective/Orientation

Future time orientation, Future time perspective, and Future thinking all use the word 'future'. However, future time orientation and future time perspective refer generally to the extent to which an individual is influenced by and/or oriented toward anticipated, expected, or predefined future events. Conversely, Future thinking, as we conceptualize it, involves visionary, open-ended, big-picture thinking in which all possible future scenarios are considered. Future thinking is measured by assessing the extent to which individuals engage in visionary, creative, innovative thought. Future thinking does not involve a focus on predefined or presumed future scenarios, a characteristic attributed to having a Future time perspective. A useful metaphor for understanding the difference between Future thinking and Future time perspective/orientation is as follows: Future thinking is analogous to an artist standing in front of a blank canvas imagining an infinite number of possible paintings to draw, whereas Future time perspective/orientation is analogous to an artist who has already decided what the canvas should look like when he or she is finished painting it. In summary, Future thinking is visionary, creative, and open-ended – the focus is on how a future 'can' unfold, whereas a person who has a Future time perspective/orientation is one who pre-defines how the future 'should' unfold and plans his or her life accordingly.

One area of overlap between Future thinking and Future time perspective/orientation is that of extension (the length of the time span over which the future is conceptualized). Visionary thinking requires, in part, the ability to 'extend' one's mind out into the future. Consider this quote from Lewin (1942):

"a person with a short future time perspective might be satisfied with the status quo, and as a result shrink from making decisions of [...] importance. [On the other hand,] at the other extreme is the individual who refuses to think in a time perspective of less than a thousand years. He thinks in terms of "what ought to be" ... and he refuses to take any action which might run counter to his principles. In so far as his goals are characterized by a high discrepancy between "what is" and "what should be," between the wish level for the future and the present reality level, his time perspective is the opposite to that of an individual who is satisfied with the status quo. But the very weight which the distant goal has for the individual who takes it seriously, the very fact that he is dissatisfied with the present situation, make it difficult for him to give sufficient consideration to the actual structure of the present situation, or to conceive realistically what step in the present world can be taken to achieve this end" (Lewin, 1942, p. 91)

What Lewin (1942) appears to imply is that someone who has a long-term perspective is not necessarily one who is active in setting short-term or even intermediate life goals and in structuring one's life to achieve those goals, as many researchers have later suggested. Rather, such a person is, for the most part, someone whose orientation to the future is both visionary and idealistic, a perspective that may lead to a disregard of or failure to structure their present lives or take realistic steps necessary to achieve those goals. Thus, the longer one's future time perspective, the less realistic and more visionary a person's goals become. Only when goals are set in the more immediate (or proximal) future, are

individuals able to truly engage in the kinds of structure behaviors that lead to goal attainment, a perspective that is consistent with years of goal-setting research and the effects of distal versus proximal goals on motivation (e.g., Bandura, 1986; Locke and Latham, 1990).

Present thinking and present time perspective/orientation. Present time orientation, Present time perspective, and Present thinking all use the word 'present'. However, Present time orientation and Present time perspective both refer to the extent to which an individual is unconcerned with the future or future consequences (e.g., de Volder, 1979; Lens, 1986; Nurmi, 2005; Nuttin, 1985) and is often measured by examining the extent to which individuals engage in hedonistic behavior (that is, an attachment to and/or focus on immediate physiological and sensory gratification accompanied by a lack of goal setting, planning, or concern with future consequences). (We note that recently, Zimbardo and associates [e.g., Zimbardo & Boyd, 1999] differentiated between two types of Present time perspectives: hedonistic and fatalistic Present time perspective, with the latter referring to someone who believes that he or she has no control over their future.) Conversely, Present thinking, as we conceptualize it, involves organized, structured thinking oriented toward controlling present and future outcomes and refers to a natural cognitive and behavioral inclination of people to organize data, information, things, activities, and more generally, their lives. It is like the difference between an artist who decides exactly what he or she is going to draw and on what size canvas, whether to paint using acrylic, oil, or watercolor, and what type of brushes will be needed to achieve the desired effect (Present thinking), versus an artist who doesn't care what the final product will look like and merely splash cans of paint all over the walls of an apartment (hedonistic present time perspective).

In our view, Present thinking should correlate with Future time perspective/orientation and not with Present time perspective/orientation since proximal goal setting and planning usually follow from expecting and or predefining how the future should unfold. For example, filling one's psychological future with events such as getting married, raising children, getting an advanced degree followed by a job in a specific field, etc. (Future time perspective/orientation) will naturally lead to the engagement of behavior that will maximize the probability of these events occurring. Indeed, we believe that researchers have erred in confusing the motivational and behavioral consequences that follow from having a Future orientation from Future time orientation itself. Because Future time perspective is often viewed as the extent to which individuals are concerned with future consequences, we find ourselves asking "future consequences of what?" To that we answer: "Present behavior!"

Consider, for example, the simple process of making plans. To make a plan, by definition, is to take an action today that is oriented toward some future outcome. Planning therefore appears as a future-oriented activity. However, planning is not something that is done by the part of the mind that sees future possibilities. Planning is the result of having selected the most desired or probable of those

possibilities. Instead, planning is a defining feature of Present thinking. It is part of consciousness's drive to control and predict outcomes. Present thinking, in effect, involves the engagement of planning to extend the present time frame, over which it has worked to gain control, as far into the future as possible.

Consider another example – the difference between a person who hedonistically pursues pleasures without a concern for the consequences of such behavior and another person with a more Calvinist attitude who delays gratification and works hard for goals that may be realized only in the future. Clearly, the person who delays gratification to achieve future goals is oriented toward the future. But that doesn't mean he or she is using Future thinking. Conversely, it is clear that the hedonist is oriented toward the present, but this person is not utilizing his/her Present thinking. In the MindTime model of thinking, the hardworking, pleasure-deferring person, like the planner in the previous example, although oriented toward future outcomes, is focusing their attention on what needs to be accomplished now or in the immediate future to achieve one's goals or vision. Thus, Present thinking is goal oriented. But is more than that: fundamentally, Present thinking is about ensuring long-term survival. In today's day and age, when individuals are taught to develop and achieve very specific outcomes that fit in with social schemas and expectations, Present thinking, because it involves developing action plans and organizing resources to execute those plans, requires an individual to have some orientation to the future. However, it is important to differentiate the thinking processes that involve planning and organization, which are essential to survival, and are the essential characteristics of Present thinking, from the value-laden cultural expectations and preconceived ideals that individuals are expected to achieve. Thus, Present thinking involves having a Future time perspective/orientation, insofar as individuals attempt to extend the present moment as far as possible into the future by being concerned with trying to predict and control future outcomes. In doing so, Present thinking is concerned with structuring one's environment in order to achieve that which has been presumed to occur based on one's future orientation.

Finally, we note that having a Future time orientation is not a necessary or sufficient condition for such Present thinking, only that having a Future time orientation is an orientation that has been shown to naturally lead to what we define as the behaviors that follow from Present thinking. Indeed, the behaviors associated with Present thinking may also arise spontaneously as a result of one's own natural tendencies to engage in Present thinking (e.g., feeling compelled to reorganizing the food in the pantry or organize one's desk) and/or as a result of situational imperatives (e.g., being given a task to do by one's supervisor).

Past Thinking and Past Time Perspective/Orientation

Past time orientation, Past time perspective, and Past thinking all use the word 'past'. However, Past time perspective/orientation refers to an individual who is focused on the actual events stored in memory and the affective tone of those events. For example, Zimbardo and Boyd (1999) identified two types of Past

orientation: an orientation toward past events that invoke positive feelings and an orientation toward past events that invoke unpleasant or negative feelings. Conversely, Past thinking refers to the mental activity oriented around accessing and utilizing past experiences and semantic information stored in memory. The key difference is that Past thinking is the act of recollection itself and the analysis that follows accompanied by a general unconcern for the specific contents stored in memory, except as they apply to the current or future situation under consideration, whereas Past time perspective/orientation refers to someone who generally 'lives' in the past and is oriented toward and/or influenced by either the positively or negatively toned experiences upon which they are focused. A person who has a strong Past orientation is someone who uses the recollective and reflective aspect of their Past thinking but then becomes so attached to specific memories of experiences that they fail to engage in information gathering and analytic aspects of Past thinking. It is like the difference between an artist who has at his or her disposal knowledge and seeks out additional information regarding different types of paints, brushes, pencils, canvas, and painting methods that can be used to achieve the desired effect (Past thinking) versus an artist who only knows or remembers how to draw in watercolor (Past time perspective) or who is overly attached to one particular method of painting that they fail to recognize alternative methods that might be more effective for achieving the desired effect.

Summary

In summary, our model uses the terms past, present, and future to describe different patterns of perceptual and cognitive mental activity associated with how individuals utilize their episodic and semantic memory systems to approach and/or avoid positively and negatively valent environmental stimuli. Conversely, time perspective has generally been used to refer to an individual's orientation to, identification with, and influence by, the content that fills their personal past, present, and future. We also noted that although the words 'past', 'future', and 'present' are used to refer to the past, present, and future, respectively, the contextual meaning of the words differ when referring to Past, Present, and Future thinking versus past, present, and future time perspective. We then briefly compared the constructs of Present and Future thinking with those of present and future time perspective and the construct of Past thinking with the construct of past time perspective. In a related article (Fortunato & Furey, 2010), we found support for our hypothesized relationships. We also discussed the difference between the constructs of time perspective and temporal perspective and noted that descriptions of Past, Present, and Future thinking largely mirror those observed in the laboratory when temporal perspective is manipulated. In closing, we propose that a person's psychological orientation toward time (their time orientation) is largely dependent on the extent to which they primarily utilize their Past, Present, and/or Future thinking

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A Critical Analysis of Zimbardo and Boyd's Time Perspective Inventory

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Zimbardo and Boyd (1999) defined time perspective as the “nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories...[involving] cognitive frames ... [that] are used in encoding, storing, and recalling experienced events as well as in forming expectations, goals, contingencies, and imaginative scenarios”(p. 1271). Similarly, Holman and Zimbardo (2009) defined time perspective as “a pivotal cognitive filter that parses the ongoing stream of conscious experience and awareness into the past, present, and future” (p. 137). We have a few comments regarding Zimbardo and Boyd’s (1999) conceptualization and operationalization of time perspective.

First, we note that although Zimbardo conceptualized time perspective as a temporally-based cognitive filter, as we did with our construct of thinking perspective, we argue that Past, Present, and Future thinking are distinct patterns of perceptual and cognitive activity that mediate the influence of neurological systems on individuals’ perceptions, motivations, behaviors, personality traits, and their time orientation.

Second, Zimbardo’s conceptualizations of the different dimensions of time perspective (and there are five of them) are more closely aligned with the definitions and operationalizations of time orientation than with either Liberman and Trope’s (1998) conceptualization of temporal perspective or with our construct of thinking perspective.

Third, we note that Zimbardo’s operationalization of the different dimensions of time perspective contains conceptual and methodological inconsistencies. Indeed, Zimbardo and Boyd (1999) indicated that their Time Perspective Inventory (TPI) was empirically driven and “[not based on any] *a priori theoretical prediction of the number or characteristics* [emphasis added] of the factors that [they] would obtain” (p. 1273). Specifically, a review of the TPI shows that many of the subscales (and the items contained in those subscales) do not adequately assess the intended construct (criterion deficiency), are contaminated with other constructs (criterion contamination), and have unsound psychometric properties. For example, although Zimbardo and Boyd defined Future time perspective as the extent to which individuals are able to extend their vision into the distant future and engage in distal goal setting, most of the items in the Future time perspective scale assess conscientious behavior oriented toward the immediate present or near-term future (e.g., “It upsets me to be late for appointments,” “I meet my obligations to friends and authorities on time,” “I believe that a person’s day should be planned ahead each morning,” “I make lists of things to do”).

Similarly, although Zimbardo and Boyd (1999) defined Present time perspective as a general unconcern with the future, an examination of the items in their present hedonistic scale indicates that many items relate conceptually to other constructs, such as sensation seeking (e.g., “I take risks to put excitement in my life”), impulsiveness (“I do things impulsively”), intuition (“I often follow my heart rather than my head”), passion (“I like my close relationships to be passionate”), flow (“When listening to my favorite music, I often lose track of time”), and the extent to which individuals live life fully (“I try to live my life as fully as possible, one day at a time”). Although Zimbardo and Boyd found that scores on their present hedonistic time perspective scale correlated

negatively with a measure of consideration of future consequences ($r = -.31$), shared variance was only 9%. We argue that Zimbardo incorrectly concluded that individuals who engage in sensation seeking (Zuckerman, 1971; 1984a, 1984b), are impulsive (Gray, 1970, 1982, 1987), approach life passionately, make decisions intuitively, or experience flow (Csikszentmihalyi, 1990) are individuals who are unconcerned with the instrumentalities and future consequences of their behavior. For example, according to Csikszentmihalyi (1990), flow is a state of mind that occurs when a person is so fully in the present moment that they can lose track of time and a sense of self. According to Csikszentmihalyi, flow is likely to occur when individuals who have mastered a set of skills are placed in a challenging and stimulating environment in which to demonstrate their skills, such as a virtuoso violist performing a violin concerto. We argue that the experiences of flow or of passion or of living life fully are not consistent with prevailing definitions of present time orientation, but rather represent a psychological outlook about living *in* the moment (flow) rather than living *for* the moment (hedonism).

Also similarly, we note that items on Zimbardo and Boyd's (1999) present fatalistic scale appear to confound Past, Present, and Future time orientation. For example, a few items on the scale suggest a fatalistic orientation toward the *future* (e.g., "It doesn't make sense to worry about the future, since there is nothing I can do about it anyway," "You can't really plan for the future because things change so much"); one item suggests a past positive orientation ("Life today is too complicated; I would prefer the simpler life of the past"); and two items suggest a present hedonistic orientation ("Spending what I earn on pleasures today is better than saving for tomorrow's security," "It takes the joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products").

Finally, we note that an examination of the final factor structure of the TPI reported by Zimbardo and Boyd (1999) shows that many items cross-loaded on multiple latent factors, had only moderate (at best) factor loadings with their intended latent variable, and in total, explained only 36% of score variance. Our own exploratory factor analysis ($N = 813$: Fortunato & Furey, 2010) of the 56 TPI items found that 15 factors with eigenvalues greater than 1.00 accounted for 58.3% of score variance, with many of these factors consisting of items from more than one of Zimbardo's original scales.

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Construct Explication: Imagining the Future versus Planning for the Future*

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At this point we note that researchers have adopted different terminologies to describe the imaginative and speculative processes associated with mental time travel into the future. Whereas retrospective thinking about one's personal history versus general knowledge stored in memory are often referred to merely as episodic versus semantic memory, respectively, the act of engaging episodic memory to mentally time travel into one's personal future has been referred to as *episodic future thinking* (e.g., Atance & O'Neill, 2001, 2005), *episodic foresight* (Martin-Ordas, Atance, & Louw, 2012; Suddendorf, 2010; Suddendorf & Moore, 2011), and *episodic simulation* (Schacter & Addis, 2007). Conversely, the act of utilizing semantic memory to think, speculate, and hypothesize about the future in general has been referred to as *semantic future thinking* (Atance & O'Neill, 2005), *semantic prospection* (e.g., Buckner & Carroll, 2007; Gilbert & Wilson, 2007; Suddendorf & Corballis, 2007b), and *semantic fantasy* (Merker, 2007).

Mental time travel, therefore, has been used as a broad construct that involves the ability to recollect, recall, and reconstruct past experiences (episodic memory) and stored knowledge (semantic memory) and the ability to prospectively imagine possible future scenarios, both personal (e.g., episodic future thinking) and non-personal (e.g., semantic future thinking). It is this combination of past and future mental time travel that appears to have provided early hominins an evolutionary advantage over other species. Having a set of experiences from which to draw from (accessed via episodic and semantic memory systems) allowed hominids to imagine possible futures (episodic future thinking and semantic prospection) and subsequently, plan for those that were deemed most viable and probable (e.g., Suddendorf, 1999; Suddendorf & Corballis, 1997, 2007a, 2007b).

However, regarding that last point, there are two important premises that appear in the mental time travel literature (e.g., Bar, 2007; Merker, 2007; Suddendorf, 1999; Suddendorf & Corballis, 1997, 2007a, 2007b; Tulving 1985a, 1985b, 2002b). First, mental time travel into the future provides the ability to creatively imagine an infinite variety of future possibilities. Second, such imaginings allow individuals to develop action plans based on the most likely or anticipated future scenario. Unfortunately, many researchers have confounded behavior involving *planning for the future* with *imagining future possibilities* by using the terms episodic future thinking and episodic foresight to indicate both the imagination of future possibilities as well as thinking about and planning for the future (e.g., Atance, 2008; Atance & Meltzoff, 2007; Busby & Suddendorf, 2005; Suddendorf & Busby, 2005). Such confounding of constructs likely occurred, in part, because researchers needed exemplars of behavior that were indicative of foresight in attempting to determine whether species other than Homo Sapiens engage in mental time travel (Suddendorf and Corballis, 2007b) or to determine at what age episodic future thinking develops in children. Regarding the latter, for example, Atance and colleagues (e.g., Atance & Jackson, 2009; Atance & Meltzoff, 2007; Atance & O'Neill, 2001, 2005) often operationalized episodic future thinking as the extent to which children are able to (a) act in the present to anticipate some future need; (b) engage in planning behavior; and/or (c) delay gratification.

However, we argue that researchers should not confuse *planning* for the future and *anticipating* future needs with the ability to *imagine* the future. Others have also made this argument (e.g., Merker, 2007; Mintzberg, 1981, 1994; Tulving and Kim, 2007). For example, Merker (2007) stated that it is important to differentiate between the act of engaging in speculative fantasy from behavior that follows when individuals specify, determine, and/or anticipate a specific future outcome. Moreover, Merker stated that the act of planning for the future depends on determining which of the foreseeable futures is most probable, not on the ability to imagine an infinite number of alternative futures. Mintzberg (1981, 1994) made a similar point when he differentiated between *strategic thinking* and *strategic planning*. According to Mintzberg, strategic thinking involves creating one or more alternative visions of the future, whereas strategic planning involves the articulation and elaboration of strategies, or visions *that already* [emphasis added] exist (1994, p.107).

In our view, planning for and/or anticipating the future are not characteristics associated with the act of engaging in episodic or semantic prospection. Rather, they are activities that might, but not necessarily, follow from imagining future possibilities. Indeed, mental time travel, as originally conceptualized by Tulving (1985a) and others (e.g., Suddendorf & Corballis, 1997) involves the generative imaginings of an infinite number of possible future scenarios. Mental activities of this nature, in our model, belong to the domain of Future thinking. Conversely, planning and anticipatory behaviors require that individuals select the most likely or desired scenario from the many possible alternatives that are imagined. Moreover, the goals that individuals set for themselves and the future events for which they plan are often constrained by culturally shared expectations regarding important life events (D'Argembeau, Ortoleva, Jumentier & Van Der Linden, 2010) and individuals' personal life scripts (Berntsen & Bohn, 2010). Mental activities of this nature, according to our model, belong to the domain of Present thinking.