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Abstract

Research on time perspective (TP) has struggled with several conceptual and methodological problems. One of the consistently identified shortcomings is the scarcity of reliable psychological assessment instruments. In this chapter, the authors provide a critical analysis concerning the methodological evolution of the assessment of the subjective temporality, and briefly describe some of the most representative measures. While most assessment efforts were initially set on the use of qualitative procedures, current research studies and conceptual developments are mainly founded on the use of quantitative assessment instruments providing several measurement indicators. There are, however, some remaining issues that must be addressed concerning the construction and development of innovative assessment procedures used in the understanding of the impact of subjective temporality constructs on individual and social behavior.

8

Assessment Techniques in the Study of Time Perspective and Subjective Time: From Qualitative to Quantitative Assessment

Victor E.C. Ortuño, Maria Paula Paixão,
and Isabel Nunes Janeiro

*What gets us into trouble is not what we don't know
It's what we know for sure that just ain't so.
—Mark Twain*

Since the first moment when humans began asking existential questions,
two powerful ideas have dominated: the meaning of life and the existence
of God. Still, there is a third idea that has mesmerized humans for as long
as history can remember. And that idea is time, a notion that connects

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15 with those two first ideas, but also is a structure that brings order to
16 human existence (Kant, 1781/1997). According to Dias, “Time is one of
17 the classic concepts whose study still holds a timeless relevance” (2009,
18 p. 42). In part, this is because time, or more specifically the unique
19 human ability to think about the future, has been considered a catalyst
20 for our species’s success (Husman & Shell, 2008); it is certainly one of
21 our biggest evolutionary advantages over other species.

22 Aside from absolute conceptions about time from ancient Greek phi-
23 losophers like Zeno or Aristotle, the mechanistic view of Isaac Newton, or
24 the relativistic interpretation of Einstein about temporal phenomena,
25 psychologists and other social practitioners and scientists have another
26 relevant aspect of time to be considered—the individual one. Time genesis
27 as a psychological phenomenon can be understood from a construc-
28 tivist point of view, as proposed by Piaget (1986). Within this model, the
29 knowledge (in this specific case, temporal) does not come solely from the
30 external objects of the individual (empiricism) nor from endogenous
31 structures already present in him (innateness). Instead, it originates from
32 the interaction of these two components (Piaget, 1986). Through Piaget
33 (1977) experiments, we learned that time is critical in the intellectual
34 development of children, but the opposite is also true: children’s intellec-
35 tual development is crucial for them to understand temporal phenomena.
36 The development of time perspective (TP) is directly influenced by exter-
37 nal factors such as socialization, education, and culture (Seginer, 2009).

38 In this chapter, we focus on assessment of temporal concepts related to
39 the subjective and individual aspects of time, categorized as Time III by
40 Vásquez (2011). In this categorization, psychological time is divided into
41 four categories: Time I, or cosmological time, is related to natural cycles
42 and their effects on the biological aspects of behavior; Time II, or percep-
43 tive time, focuses on the study of temporal perception and estimation;
44 Time III, or subjective time, which is connected with individuals’ per-
45 sonal conceptions of time and the cognitive processes grounded in time;
46 and Time IV, or cultural time, relates to the temporal concepts that are
47 developed socially, such as cultural representations of time and the values
48 associated with it.

49 The definition of subjective time has always been troublesome, with
50 several approaches but no real consensus on its definition, dimensions,

and measurement. If we take into account a broad approach to subjective 51
temporality, we can find a large number of paradigms; some have received 52
more attention than others from the scientific community in the last 53
decades. Some of the concepts proposed are the following: time orienta- 54
tion (Nuttin & Lens, 1985), time perspective (Zimbardo & Boyd, 1999), 55
temporal focus (Shipp, Edwards, & Lambert, 2009), consideration of the 56
future consequences (CFC, Joireman, Shaffer, Balliet, & Strathman, 57
2012), and future hope (Snyder et al., 1991). According to Vella (1977, 58
cit. in Lennings, 1994), over 100 methods have been developed to mea- 59
sure temporal orientation. McGrath and Kelly (1986) and Boniwell and 60
Zimbardo (2004) also identify the existence of about 211 approaches to 61
time perspective (TP), which taken with the existent lack of efforts to 62
compare results across different assessment instruments in subjective 63
temporality topics (Ortuño & Janeiro, 2009, 2010) makes it “impossible 64
to measure a construct that has as many conceptualizations as there are 65
measurement tools” (Lasane & O’Donnell, 2005, p. 15). 66

It is relevant to make a clear distinction between two of these time 67
concepts, since several misunderstandings have been created around 68
them: time perspective and time orientation. Time perspective, or TP, is 69
a multidimensional concept related to the use of temporal categories of 70
past, present, and future dimensions. These categories are used to create 71
a coherent organization of the individual’s internal and external motiva- 72
tional objects. Time orientation, on the other hand, according to Lasane 73
and O’Donnell (2005) refers to a more circumscribed concept involving 74
individual’s preference for a determined temporal dimension (Nuttin & 75
Lens, 1985). 76

In our understanding, one of the most important concepts regarding 77
the individual’s temporality is the concept of TP. First referred to by 78
Frank (1939, as cited by Lewin, 1943), it is a concept related to the indi- 79
vidual’s life-space and is not limited by the present time. On the contrary, 80
it includes also the individual’s remembered past and imagined future. 81
The importance of this concept for psychology is underscored by Lewin 82
(1942) when he states that “the behavior of an individual does not depend 83
entirely on his present situation. His mood is deeply affected by his hopes 84
and wishes and by his views of his own past” (pp. 104). These early 85
approaches to TP conceive it as transitory motivational states that affect 86

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87 the individual's level of aspiration, mood, constructiveness, and initiative
88 at a given time (Lewin, 1943). Lens (1986) suggests that the operational-
89 ization of future time perspective (and consequently TPs) over time has
90 evolved from being considered as a motivational state to its conceptual-
91 ization as a more stable personality trait.

92 The theoretical framework for TP proposed by Lewin encouraged a
93 plethora of studies regarding subjective time (Nuttin & Lens, 1985).
94 Also, it served as the foundation for subsequent theoretical models about
95 subjective time, such as Nuttin and Lens's (1985) model of TP. These
96 authors conceive TP as a cognitive-spatial concept—cognitive because it
97 is formed by motivational objects or events that exist on the cognitive
98 level of behavioral functioning, and spatial because these same motiva-
99 tional objects of events are located on a temporal continuum. Individuals
100 perceive these motivational objects as located either in the past, present,
101 or future, even when in fact, physically, those same objects or events are
102 thought of by the individual in the present moment.

103 TP multidimensionality is based on the independence of the three
104 temporal frames, namely past, present, and future TPs. Still, authors like
105 Nuttin and Lens (1985) suggest specific subdimensions within the future
106 time perspective, such as extension, density, degree of structuration, and
107 level of realism. These subdimensions vary according to each author's
108 conceptualization of TP and are explored in detail later, as we discuss dif-
109 ferent models.

110 According to Ortuño (2014), in order to avoid misunderstandings it is
111 important to differentiate between TP temporal dimensions (past, pres-
112 ent, and future) and their characteristics or properties. If we take, for
113 example, an individual's temporal extension, it represents an attribute of
114 this same individual past or future time perspective. The same goes for
115 the other properties previously mentioned. Such an approach of the tem-
116 poral concepts allows organization of the different existing assessment
117 techniques using varied criteria:

- 118 1. **Theoretical basis:** There are instruments like the Thematic
119 Apperception Test (TAT; Wohlford, 1966) or the Circle Test (Cottle,
120 1976) that are psychoanalytic oriented (since the defense mechanism
121 of projection is on the basis of the evaluation system they adopt); on

- the other hand, there are instruments like the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) or the Consideration of the Future Consequences Scale (CFCS; Joireman et al., 2012) that follow a more cognitive approach of subjective time assessment.
2. **Measured construct:** An individual's subjective temporality is composed of several variables (such as TP, CFC, and hope, among many others) and their respective sublevels, dimensions, or properties (like temporal attitude, temporal orientation for TP or the future, and immediate for consideration of the future consequences).
 3. **Temporal scope (partial or complete):** There are instruments that measure only one temporal dimension, such as the Future Anxiety Scale (Zaleski, 1996), while there are others that try to measure the entire individual's temporal horizon, like the ZTPI (Zimbardo & Boyd, 1999).
 4. **Relation with time:** Some constructs represent concepts directly related with time, such as TP, time attitude, or time orientation while others represent concepts indirectly related with time; some examples are future hope (Snyder et al., 1996) and sensation seeking (Zuckerman, Eysenck, & Eysenck, 1978).

Historically, the first inventories created to measure subjective temporal concepts were story- or graphic-based techniques following psycho-analytic principles. A couple of examples would be the Future Events Test (Kastenbaum, 1961) or the Time Metaphors (Knapp & Garbutt, 1958), although Boniwell, Osin, Linley, and Ivanchenko (2010) say that these approaches had flaws regarding their validity and reliability.

One of the most influential qualitative instruments developed to assess concepts related to subjective temporality is the Motivational Induction Method (MIM; Nuttin & Lens, 1985). In its shortest version, the MIM includes two small booklets with 20 and 10 pages, respectively. On top of each page there is a motivational inducer. These sentence beginnings are formulated in the first-person and the verb always expresses a tendency, effort, desire, intention, and the like. The sentence beginnings in the first booklet are formulated to induce positive motivational objects (e.g., I intensely desire...) while those in the

157 second ask for negative objects, or objects that are avoided, feared, and
158 so on (e.g., I would not like it if ...). Participants are invited to write a
159 full sentence by expressing what they desire or fear. Each goal object
160 expressed in the sentence completions is coded according to both a
161 *content* code, which comprises eight main categories of content analysis
162 (self, self-realization, realization, contact, cognitive exploration, posses-
163 sion, leisure, and transcendental) and some dozens of subcategories,
164 and a *temporal* code comprising calendar units (near future) and social
165 and biological units (intermediate and distant future, as well as the his-
166 torical future and the open present). Using the MIM, we can calculate
167 several TP indicators, such as future temporal extension and temporal
168 density (Paixão, Abreu, & Lens, 2012).

169 MIM has been successfully used in a vast number of studies. Bouffard,
170 Lapierre, and Bastin (1989) found an association between future time
171 perspective, socioeconomic status, and level of schooling. It has also
172 been used to assess differences in TP in adolescence, young adulthood,
173 and adulthood in different groups, as well as future time perspective
174 associations with several psychological and behavioral constructs
175 (Paixão, 1996; Vázquez & Rapetti, 2005). Nevertheless, MIM has lost
176 popularity in recent years to shorter instruments that are easier to score
177 and interpret.

178 Other instruments developed within the qualitative paradigm are the
179 Thematic Apperception Test (TAT; Wohlford, 1966), the Rappaport AU5
180 Time Line (Rappaport, Enrich, & Wilson, 1985), Cottle's Circle Test
181 (Cottle & Klineberg, 1974), and the Life Events Inventory (Nurmi,
182 1991). Currently, the use of qualitative instruments has diminished dras-
183 tically, mostly due to a focus on developing instruments with stronger
184 psychometric guarantees.

185 In the last decades, simpler and more objective approaches to assess
186 TP were carried out (Zimbardo & Boyd, 1999), some examples are the
187 Future Anxiety Scale (Zaleski, 1996; Zaleski, Sobol-Kwapinska,
188 Przepiorka, & Meisner, 2017), the Future Time Orientation Scale
189 (Gjesme, 1979), the Long-Term Personal Direction Scale (LTPD,
190 Wessman, 1973), and the Future Time Perspective Questionnaire AU6
191 (Stouthard & Peetsma, 1999). After an analysis of these inventories, it
192 is possible to agree with Boniwell et al. (2010), who state that these

instruments clearly represent an improvement regarding the statistical 193
indicators but it is at the expense of presenting lower assessment capabilities, 194
since they are mostly focused on one predominant time orientation. 195

Nevertheless, a cursory glance at the subjective time research shows an 196
uneven distribution in the number of publications about each of the 197
three temporal frames (past, present, and future). Most of the studies are 198
focused on the future frame. Shores and Scott (2007) argue that “the 199
bulk of TP research has investigated the relationship of future and present 200
time perspectives to other psychological constructs and behavioural out- 201
comes. Less empirical attention has been given to past orientations” 202
(p. 31). We believe that one cause for the dominance of future over the 203
other two temporal frames is the influence of well-known authors like 204
Nuttin and Lens (1985), Gjesme (1979, 1983), and Nurmi (1991), who 205
have devoted much of their research efforts to studying the influence of 206
future TP on individuals’ motivation. Nuttin and Lens (1985), for exam- 207
ple, have discussed future time perspective as being the individual’s main 208
motivational space. 209

The influence of future time perspective is especially important when 210
exploring cognitions and/or behaviors profoundly related to planning, 211
anticipation, and achievement. But, as demonstrated by Ortuño and 212
Vásquez (2013), some of the negative temporal frames such as Past- 213
negative and Future-negative are important predictors of self-esteem. 214
Also, emotional states are related to both the Past-negative and Present- 215
hedonist perspectives (Stolarski, Matthews, Postek, Zimbardo, & Bitner, 216
2014). Ortuño et al. (2013) report that the Past-negative is a significant 217
negative and moderate predictor of satisfaction with life, interpersonal 218
relations, and psychological well-being. We consider that currently there 219
is enough evidence about the important role not only of future time per- 220
spective but also of past and present time perspectives in the understand- 221
ing of cognition and behavior. As such, depending on the nature of the 222
construct that is intended to be studied, researchers should consider dif- 223
ferent TPs and not only its future frame. 224

One of the latest TP models that follows Lewin’s and also Nuttin and 225
Lens’s (1985) theory is proposed by Zimbardo and Boyd (1999). This 226
new approach is characterized by a multidimensional approach to 227
TP. While Nuttin and Lens (1985) acknowledge the existence of the past 228

229 and future temporal frames, they decided to focus on the motivational
230 impact of the future time perspective on present behavior, while Zimbardo
231 and Boyd (1999) take an integrative view of all temporal frames, includ-
232 ing past, present, and future, as a cognitive-motivational process with
233 large implications not only for motivation but also for objects
234 perceptions.

235 According to Zimbardo and Boyd (1999), TP is “the often noncon-
236 scious process whereby the continual flows of personal and social experi-
237 ences are assigned to temporal categories, or time frames, that help to
238 give order, coherence, and meaning to those events” (pp. 1271). The
239 authors also refer to TP’s involvement in all process of encoding, storing,
240 and retrieving of past events, as well as the development of expectations
241 and goals; as such, it has a strong impact at both cognitive and behavioral
242 levels.

243 The Zimbardo Time Perspective Inventory (ZTPI, Zimbardo & Boyd,
244 1999) has been one of the most widespread instruments in the last two
245 decades, with more than 1600 citations on the Google Scholar database
246 (Ortuño, Janeiro, Paixão, Esteves, & Cordeiro, *in press*). The instrument
247 and the theoretical basis presented by Zimbardo and Boyd (1999) rede-
248 fined research in subjective temporality by demonstrating the indepen-
249 dence of the three main temporal frames (the past, the present, and the
250 future) and the importance of studying the complete temporal horizon
251 and not just one of its frames (usually the future). These authors present
252 an inventory that is easy to administer, score, and interpret; it is allied
253 with a coherent structure of five temporal dimensions: Past-positive,
254 Past-negative, Present-hedonist, Present-fatalist, and Future. The ZTPI
255 has been adapted by more than 24 countries and used a series of cross-
256 cultural studies, demonstrating with a sample of about 12,000 partici-
257 pants that the five-factor structure is present in most countries where data
258 were collected (Sircova et al., 2014).

259 Over time, some adjustments were introduced to Zimbardo and Boyd’s
260 (1999) model. The Transcendental-Future Time Perspective Scale
261 (TFTPS, Zimbardo & Boyd, 2008) was the first addition, which com-
262 prises 10 statements about the possible life after the death of the physical
263 body. Still, the research body gathered since its conception isn’t clear
264 about the relevance of this construct. Few researchers have studied this

temporal dimension (Desmmyter & De Raedt, 2012; van Beek & Kairys, 2015), and the results haven't been consistent across studies. A few examples of studies addressing this temporal dimension are presented by Ortuño, Paixão, and Janeiro (2011), who in a cross-sectional study with a sample of college students found a decrease in the average values of TFTP as students advance in school.

Given the nature of its content, the transcendental future time perspective can be partially associated with religious beliefs, since many religions are based on the belief of life after death, of an immortal soul or entity that will be rewarded or punished according to the individual's actions on earth. However, we believe that transcendental future should not be exclusive of religious individuals; it may also exist in individuals who manifest a high degree of spirituality, even if they don't relate to any religious doctrine. Seema, Baltin, and Sircova (2014) argue that TTFPS measures afterlife beliefs but not necessarily a TP related to this temporal frame.

A second addition to Zimbardo and Boyd's model follows Lewin's (1939) considerations about the influence of the negative future temporality on individuals. It refers to the future negative, a dimension that only a small body of researchers has addressed (Holman & Silver, 2005) and without reaching a consensus about its measurement. Carelli, Wiberg, and Wiberg (2011) introduced eight items to ZTPI related with a negative view about the future which, according to the presented results, is associated with both dependent and avoidant decisional styles. Janeiro (2012) developed the Time Perspective Scale (TPS), which is formed by four temporal dimensions: Past orientation, Present orientation, Future orientation, and a four-item dimension called Anxious Vision about the Future, which presented good psychometric indicators. This last dimension was included in Zimbardo's model revision by Ortuño et al. (in press), giving a coherent contribution to the model both at the theoretical and at the psychometrical level. Ortuño and Vásquez (2013) demonstrated its predictive power regarding trait self-esteem.

A last approach to Zimbardo's theory is related to the balanced time perspective that represents an individual's ability to flexibly switch between the TPs when considering situational demands. Zhang, Howell, and Stolarski (2013) proposed the Deviation of the Balanced Time

301 Perspective (DBTP) coefficient, a method to aggregate ZTPI's scores; it
302 includes the optimal scores of the five temporal dimensions and the indi-
303 vidual's score in each of these same dimensions. The result allows identi-
304 fying the individual's proximity or deviance from the optimal TP. Other
305 authors, using different BTP methods, have also found relations between
306 BTP and adaptive constructs, such as subjective happiness and mindful-
307 ness (Drake, Duncan, Sutherland, Abernethy, & Henry, 2008), life satis-
308 faction, optimism, purpose in life, and self-efficacy (Boniwell et al.,
309 2010). The three methods proposed by each of these authors present
310 valid solutions to calculate the balanced time perspective and they do not
311 require the use of any additional instrument.

312 In a different approach, Webster (2011) designed the Balanced Time
313 Perspective Scale (BTPS) in order to assess an individual's present bal-
314 ance between past and future time perspectives. The interaction between
315 past and future dimensions allows consideration of four temporal cat-
316 egories: Time Expansive, Futurist, Reminiscers, and Time Restrictive.
317 Time Expansive individuals are those with higher values in happiness,
318 subjective well-being, and self-esteem. Yet, as acknowledged by the
319 BTPS author, it doesn't contain a present subscale. This inventory was
320 proposed not as a substitute to ZTPI but, according to its author, to
321 address a flaw related to the measurement of the balanced time perspec-
322 tive. However, although it appears to be a psychometrically and conce-
323 ptually valid instrument, BTPS lacks dimensions to measure the
324 subjective present (Stahl, 2012); we consider that a complete conceptu-
325 alization about a balanced time perspective should include dimensions
326 related to the three archetypal temporal frames (past, present, and
327 future).

328 In order to overcome this limitation Vowinckel, Westerhof, Bohlmeijer,
329 and Webster (2015) developed the Present-Eudaimonic Time Perspective
330 scale, which assesses a positive vision about the present, where personal
331 growth, life's meaning, and living a full and satisfying life are the main
332 aspects to be considered. This new scale was included in the BTPS, with
333 a good factor structure of four components. Through regression analysis,
334 the authors show how the Present-Eudaimonic scale alone makes a sig-
335 nificant contribution to the prediction of mindfulness, flow proneness,
336 and positive mental health.

The Zimbardo and Boyd model has received several critiques during the years, mostly focused on two aspects: (1) the content validity of the five temporal dimensions, since it include aspects that are not only related with time orientation but also with other temporal considerations. For instance, Webster (2011) mentions that some items of the future subscale are more related with time management than TP; (2) the ZTPI factor structure is not as uniform and culturally invariant as mentioned by previous literature (McKay et al., 2015). Worrel, Mello and Buhl (2011) have also raised concerns about the ZTPI's scarce associations with other temporal phenomena and also with its psychometric characteristics.

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Mello and Worrell (2016) present a different model of TP, formed by the dimensions of time meaning, time frequency, time orientation, time relation, and time attitude. These authors propose a new instrument to operationalize these dimensions, called the Adolescent Time Inventory (ATI). Time meaning is referred by its authors as "individuals' definitions of the past, present, and future" (p. 1). Time frequency refers to how often individuals' think about the past, present, and future. Time orientation represents the overall tendency of an individual to function in a determined temporal frame. Time relation is the subjective notion of past, present, and future relatedness. And finally, time attitude is related to the affective component associated with each temporal frame. Still, some of these dimensions overlap with previously developed concepts. It is relevant to consider that the ATI has been adapted to several languages and cultures, such as: German (Worrell, Mello, & Buhl, 2013), Hindu, Japanese, Spanish, Swedish, and Chinese, among others. Within the most recent developments in subjective time assessment, ATI is the only instrument that combines quantitative and qualitative approaches.

Husman and Shell (2008) developed an inventory specifically measuring the future time perspective dimensions of value, connectedness, extension, and speed. Specifically, these dimensions referred to are: value is the importance that a goal has for the individual; connectedness represents individuals' ability to link their activities with its own goals; extension is related to the distance between the present moment and how far away the goals are projected; and speed represents the subjective sense of the speed of time passing. In order to operationalize this model, Husman and Shell (2008) developed the Future Time Perspective Scale (FTPS),

373 composed of those same four components, and they demonstrate that it
374 reached a strong and coherent factor structure with high reliability (except
375 for the speed component): value (seven items, $\alpha = .76$), connectedness
376 (15 items, $\alpha = .80$), extension (six items, $\alpha = .74$) and speed (five items,
377 $\alpha = .66$), with a total of 27 items.

378 More recently, Janeiro (2012) presented the Time Perspective Scales
379 (TPS) as a new proposal to measure TP and some of its dimensions. The
380 psychometric results are positive and allow consideration of TPS as a
381 valid and reliable instrument to measure not only TP in its three tempo-
382 ral frames but also the temporal extension and temporal affectivity, both
383 positive and negative, regarding the future. TPS has already been adapted
384 to Brazilian Portuguese (Janeiro, Bardagi, Teixeira, & Ortuño, 2016). We
385 note two drawbacks regarding this instrument: it lacks the assessment of
386 the negative valence regarding the past and the present time perspectives,
387 and it is still not culturally adapted to languages other than Portuguese
388 (both in Portugal and Brazil).

389 The capacity to foresee one's personal future and mental time travel is
390 a shared and probably unique human feature. It has been suggested that
391 it is a great adaptive advantage for our species (Suddendorf & Corballis,
392 2007). But this capacity also posits an internal conflict between immedi-
393 ate and distant outcomes and rewards for our behavior. For example,
394 some people sacrifice an immediate pleasure or benefit for a distant, sub-
395 jectively better outcome (e.g., not eating dessert now to be slimmer in the
396 summer). To address scientifically how people respond differently to
397 these dilemmas, the concept of CFC was proposed. The study of indi-
398 vidual differences in CFC was defined as "the extent to which people
399 consider the potential distant outcomes of their current behaviours and
400 the extent to which they are influenced by these potential outcomes"
401 (Strathman, Gleicher, Boninger, & Edwards, 1994, p. 743). It was shown
402 that the CFC is a reliable, stable, and valid construct, related to many
403 other psychological and social phenomena. According to Aspinwall
404 (2011), the CFC concept is mostly related to the subjective value of
405 future versus present outcomes. In Zimbardo and Boyd's (1999) study,
406 this concept was positively correlated only with the future time perspec-
407 tive, it correlated negatively with the Past-negative, Present-fatalist, and
408 Present-hedonist, and it showed no correlation with the Past-positive.

The CFCS measures the extent to which individuals reflect and are influenced by the immediate, as well as by the distant outcomes of current behavior (Strathman et al., 1994). It is composed of 12 items (five-point Likert scale), grouped into two subscales (future and immediate). The psychometric properties are good, with internal reliabilities typically ranging from .80 to .86, and test-retest correlations of .76 (two weeks) and .72 (five weeks), with all data relating to the complete, 12-item scale. Strathman et al. (1994) reported exploratory and confirmatory factor analyses supporting the idea of a single underlying factor. However, research carried out later suggests that the scale comprises two factors (Joireman, Balliet, Sprout, Spangenberg, & Schultz, 2008; Petrocelli, 2003; Vásquez, Esteves, Gomes, & Ortuño, 2015). For instance, Joireman et al. (2008) explored the validity of the two-factor solution. They found that the two subfactors differentially predict the trait of self-control—ego depletion and temporal discounting—with the immediate consideration of the future consequences subscale being the best and unique predictor. More recently, Joireman et al. (2012) have successfully tested a 14-item CFCS, with better factor structure and internal consistency.

Concerning the discriminant validity of the English version of the CFCS, Joireman, Strathman, and Balliet (2006) have shown the validity of the CFCS across four domains: (1) health behavior, risk-taking, and academic achievement; (2) aggression; (3) pro-social organizational behavior; and (4) pro-environmental attitudes and behavior. First, it was demonstrated that individuals who scored high on the CFCS scale reported greater general concern with health, exercising more frequently and with a lower substance abuse (Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005). Also, they were less likely to engage in risky sexual practices and more likely to get an HIV test (Dorr, Krueckeberg, Strathman, & Wood, 1999). Second, it was consistently shown that CFCS relates to aggression. The CFC mediates the relationship between impulsivity and aggression, given that impulsive people have less consideration for the consequences of their actions, which makes them more likely to engage in violent behavior. Third, some aspects of organizational behavior are also predicted by the CFCS. Research has shown that CFCS is related to willingness to engage in prosocial organizational behaviour and knowledge sharing in organizations (Joireman, Daniels, George-

445 Falvy, & Kamdar, 2006, Joireman, Kamdar, Daniels, & Duell, 2006).
446 Lastly, individuals high in CFC are usually more concerned with
447 environmental conditions and the use of natural resources, they have bet-
448 ter attitudes to recycling (Lindsay & Strathman, 1997), they tend to
449 defend and be concerned about the environment (Joireman, Lasane,
450 Bennett, Richards, & Solaimani, 2001), and they have stronger prefer-
451 ences for public transportation and for structural solutions for transpor-
452 tation dilemmas (Joireman, 2005; Joireman, Van Lange, & Van Vugt,
453 2004).

454 Another concept directly related to individuals' temporal experience is
455 future hope. Snyder, Feldman, Shorey, and Rand (2002) suggest its
456 assessment via the Adult Hope Scale (AHS), which is a two-dimension
457 inventory composed of 14 items using a four-point Likert response for-
458 mat (1 = definitely false, 2 = mostly false, 3 = mostly true, 4 = definitely
459 true). Eight items are related to dispositional hope (four are designed to
460 measure agency thinking and four pathways thinking); the remaining
461 four items are fillers. Snyder et al. (1991) reported acceptable values of
462 internal reliability (Cronbach's alpha in the total scale from .74 to .84; the
463 agency subscale from .71 to .76; and the pathways subscale from .63 to
464 .80). A similar pattern regarding AHS reliability was reported in previous
465 studies (Pais-Ribeiro, Pedro, & Marques, 2006; Phan, 2013; Rand, 2009;
466 Tong, Fredrickson, Chang, & Lim, 2010). Its temporal stability is also
467 acceptable, since the AHS presented a test-retest correlation of .85 ($p <$
468 .001) after a three-week interval (Snyder et al., 1991).

469 Results obtained using AHS showed important and positive correla-
470 tions with positive traits such as dispositional optimism ($r = .60, p <$
471 .005), desirability of control ($r = .54, p < .005$), self-esteem ($r = .58, p <$
472 .005; Gibb, 1990), subjective well-being ($r = .52, p < .01$; Melo & Pais-
473 Ribeiro, 2010), and global life satisfaction (Marques, Pais-Ribeiro, &
474 Lopez, 2009). AHS scores are negatively correlated with negative traits as
475 depression ($r = -.60, p < .001$), hysteria ($r = -.35, p < .001$), psycho-
476 pathic deviation ($r = -.43, p < .001$), schizophrenia ($r = -.46, p < .001$),
477 and social introversion ($r = -.59, p < .001$; Irving, Crenshaw, Snyder,
478 Francis, & Gentry, 1990). Interventions centered on the hope concept
479 have established its pertinence concerning adaptive cognitions, such as
480 life satisfaction and self-worth (Marques, Pais-Ribeiro, & Lopez, 2011).

Concerning the relation of this concept with other temporal variables, 481
 Aspinwall (2011) states that hope is related to the content of future 482
 orientation, but there is no reference to the extent of this relation. Phan 483
 (2009), through a SEM approach and using a reduced version of ZTPI 484
 composed only of future and present dimensions, showed that hope is 485
 mainly influenced by present time perspective, while future time perspec- 486
 tive exhibits a small influence, but without statistical significance. Still, 487
 more evidence is needed in order to fully understand the association 488
 between hope and a more complete characterization of the individual's 489
 temporal profile, since Snyder et al. (1991) consider that hope is related 490
 not only with the future but also with the past and the present. 491

Some considerations about the two main components of Snyder's hope 492
 concept may also be addressed. "Pathway" is defined as an individual's 493
 ability to produce means to achieve certain goals (Snyder et al., 2002). 494
 We believe that pathway may be related to future time perspective, owing, 495
 for example, to the association reported by De Volder and Lens (1982) of 496
 the subjective value assigned to long-term goals and the instrumental 497
 value of the activities related to those same goals with school motivation 498
 and academic results. In the case of agency, Snyder et al. (2002) present 499
 it as an individual's cognition regarding his or her ability to successfully 500
 achieve his or her goals—structurally different from the concepts of opti- 501
 mism and self-efficacy. Still, we consider that agency is more an affective 502
 component of hope, so temporal affectivity would certainly be related to 503
 it. Likewise, since self-esteem is considered as the evaluative part of self- 504
 concept (Heatherton & Wyland, 2003), and it is negatively correlated 505
 with the more TP's negative dimensions (past negative and future nega- 506
 tive), we believe that those dimensions of TP will be equally negatively 507
 associated with agency, which is a dimension that requires a certain sense 508
 of self-evaluation. 509

The Temporal Focus Scale (TFS, Shipp et al., 2009) is presented as an 510
 inventory to measure the concept of temporal focus, which its authors 511
 define as "the attention individuals devote to thinking about the past, 512
 present, and future" (p. 1). These authors consider it as a component of 513
 an individual's TP. Still, in our opinion this concept presents a high 514
 resemblance to the concept of temporal orientation, since both are 515
 referred to as individual's active use of a specific temporal frame or a 516

517 combination of them in the present moment. The reported results are
518 positive concerning its factor structure and several validity aspects (con-
519 struct, convergent, discriminant, and predictive). Yet, we must highlight
520 that the concept of temporal focus is not as wide as the concept of TP, so
521 we further believe that its predictive value will not outgrow TP's.

522 Among the varied temporal concepts that we have explored in this
523 chapter, we would like to stress two aspects of TP that define very well the
524 extent and importance of its influence not only on behavior but also on
525 several important cognitive processes. The first aspect is concerned with
526 its contribution to the cognitive process of retrieving memories from past
527 events or from motivational objects located in the past, present, or future.
528 That process is highly dependent on the individual's temporal profile or,
529 in other words, on which temporal frame the individual relies on the
530 most. This is because the preferred temporal frames serve as a cognitive-
531 affective filter, which helps in the determination of which memories
532 should be retrieved or which motivational objects should be accessed. All
533 the information, events, memories, or motivational objects that must be
534 encoded, stored, and retrieved are affected by the configuration of the
535 individual's temporal profile.

536 The second aspect refers to TP's flexibility, since as referred to by
537 Zimbardo and Boyd (1999), as well by other authors, TP is a relatively
538 stable trait, but is also affected by cultural, educational, religious, social,
539 and family variables, and this effect is constant. Thus, TP is a dynamic
540 process constantly affected by other environmental forces, which in turn
541 are affected by TP, at least at a representational level, which brings us back
542 to the former aspect.

543 Considering those two aspects, it is our understanding that TP is a
544 cognitive-affective-motivational process involved in organizing most of
545 the stimuli that our perceptive system receives, as well as the cognitive
546 inputs–outputs that our cognitive system processes. It is also a process
547 that modifies itself according to the environmental influences, but impacts
548 those same influences in return. We illustrate TP functioning as a feed-
549 back process, represented in Fig. 8.1 as an infinite loop in which the pres-
550 ent stimuli are both interpreted and affected by past memories and future
551 goals and aspirations, while those same present stimuli have the ability to
552 modify the information contained in the past and future temporal frames.

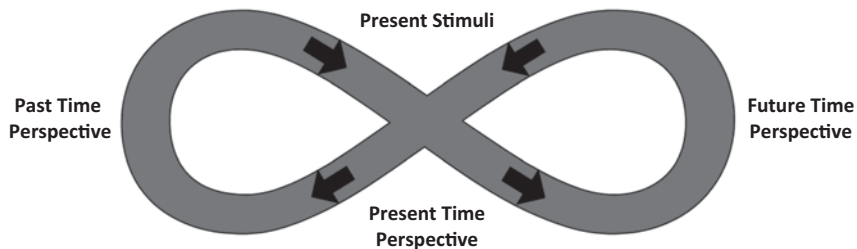


Fig. 8.1 An illustrative model of TP's dimension interaction

As we can see, each new model of TP brings new dimensions and properties to be considered, and this is an expression of the health and dynamism that this field of study possesses at this moment. Yet, there is a long row to hoe if we want to achieve a model that truly represents all the aspects within TP, with both a domain-general and a context-specific outlook.

It is important to keep in mind a subtle but important difference between the psychology of time and subjective temporality. We consider the psychology of time as the broad field that encloses all the studies concerning the time experience at all its levels. Within the psychology of time we can include the four levels proposed by Vásquez (2011), which help in organizing the entire human temporal phenomenology. Subjective temporality, on the other hand, should include all the individual cognitive structures that are indirectly related to temporal concepts (such as sensation seeking) or those that are directly related to the temporal experience (such as TP, time orientation, or the CFC), which within Vásquez (2011) taxonomy is referred, or specifically as Time III.

As the studies about subjective time are becoming more precise, some important aspects should be considered in future studies:

1. If we take into account all the instruments mentioned in this chapter, there is a similarity across them—they are self-report questionnaires. This might imply that participants' responses could be affected by a social-desirability bias or even an emotional bias, in the sense that most of these constructs aren't undoubtedly defined as stable traits or as emotionally induced states. New measures could include a third-

578 person assessment component, direct behavior observation, or even
579 the use of new methods such as virtual reality, which could facilitate
580 the combination of quantitative and qualitative approaches.
581 Nonetheless, considering the criteria previously proposed to organize
582 and analyze the assessment techniques presented in this chapter, we
583 can observe that each one of those instruments represents a different
584 combination of values among those criteria.

585 2. At the conceptual level, it is still relevant to trace the differences and
586 similarities among the several temporal concepts present in the litera-
587 ture, since there is a high degree of confusion and superposition
588 between them. Most studies are being developed using a cross-sectional
589 approach—comprehensible due to methodological, economic, and
590 temporal restraints. Yet, this brings, as a consequence, the existence of
591 very few longitudinal studies being published. Hamilton, Kives,
592 Micevski, and Grace (2003) refer to this fact as an actual limitation in
593 temporal research, because of the restricted current understanding
594 about aging and TP. On the other hand, Lasane and O'Donnell (2005)
595 mention the question of participants' cultural variations or nonnor-
596 mative characteristics, which in most cases are not being considered in
597 the assessment of temporal phenomena. Equally important is the elab-
598 oration of comparative studies between instruments, promoting syn-
599 ergies that allow us to reach a better understanding of subjective
600 temporality and its subconcepts, as key in understanding human
601 dynamics. In other words, we recommend the development of com-
602 parative studies, discussing why the new methods presented are more
603 adequate than the previous, or in which way they might complement
604 already validated instruments. An effort developed in this direction
605 was presented by Ortuño and Janeiro's (2009) study, when analyzing
606 the differences and complementarities between ZTPI and TPS.

607 3. Regarding specific contexts of intervention, it's important to develop
608 new models for understanding a more varied array of psychopathol-
609 ogies, since most studies are focused in anxiety disorders, such as
610 posttraumatic stress disorder (see Zimbardo, Sword, & Sword,
611 2012) or mood disorders, such as depression (see Kazakina, 2013).
612 In temporal research, it is common to focus mainly on temporal
613 orientation variables. Still, human behavior is not guided only by

this aspect of subjective time; is not enough to consider only the individual's temporal preferences in order to analyze the person's cognitions and behavior. New assessment techniques should include a more complete array of temporal dimensions (past, present, and future), but also the properties within these same dimensions (orientation, extension, degree of realism, among others). This need allows us to reiterate the Boniwell et al. (2010) view on the upcoming development of TP inventories (or even subjective temporality inventories) when they consider that not only the individual's time orientation or preferred temporal frame should be assessed but also its dimensions or how we consider more appropriate to denominate its properties.

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