It's About Time: Applying a Daily Diary Design to Investigate the Dynamic Relationships between Temporal Perspective and Well-Being

by

Jonathan Rush
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Supervisory Committee

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Abstract

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Temporal perspective is a multi-dimensional term for how individuals focus attention toward the past, present, and future. There have been few investigations into the relationship between temporal perspective and well-being. Temporal perspective has predominantly been measured with single-occasion measurement designs, which ignore the potential for within-person variations that may be important in accounting for fluctuations in well-being. The current study examined the dimensions of temporal perspective (*temporal focus, temporal attitude,* and *temporal distance*) and their dynamic relationships with well-being. A 14-day daily diary design was employed to examine whether people fluctuate in their temporal perspective, and if these fluctuations systematically covary with daily well-being. The results from multilevel analyses supported the following conclusions: (a) there is evidence of within-person variability in daily temporal perspective, and (b) this within-person variability in temporal perspective fluctuates systematically with fluctuations in daily well-being. Each temporal perspective dimension was useful in predicting daily well-being.

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Acknowledgments

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Introduction

The study of time has interested many diverse disciplines including philosophers, anthropologists, physicists, and psychologists. In western societies time is often considered to be unidirectional and linear (Boniwell, 2009). However, our subjective experience of time provides us with the opportunity to revisit the past through our memories, experience the present as it occurs, or anticipate the future through expectations. This ability to cognitively travel across temporal regions through our thoughts and attention allows us to personally experience time apart from the objective passage of time that evaporates with every tick of the clock. The manner in which one directs their thoughts toward either the past, present, or future influences their experience, motivations, and behaviours (De Volder, 1979). Though there has been considerable interest in understanding objective time, or "clock-time", the focus of the current research involves an individual's subjective experience of time and its relationship to well-being.

The subjective experience of time has been important to psychologists for many years. William James devoted an entire chapter to "time perception" in *The Principles of Psychology* (1950/1890). Similarly, Lewin (1951) acknowledged the importance of time by including it in his *field theory* as part of the *life space*. Lewin adopted the term "time perspective" and described it as the "totality of the individual's views of his psychological future and his psychological past existing at a given time" (p. 75). Since this time the term *time perspective* has been used broadly, and with little consistency, as an umbrella term that incorporates several different components of temporal perception. A review of the literature found over 200 different descriptions of the term time perspective (McGrath & Kelly, 1986). Temporal perspective broadly refers to 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). Thus, it is a multidimensional construct that encapsulates the cognitive structuration of each temporal region. The dimensions that commonly fall under the overarching term of temporal perspective include temporal orientation, attitude, and extension (Jones, 1993).

In addition to the inconsistency in defining temporal perspective, there has been much variation in how the construct has been measured. Initial measurement instruments attempted to capture the construct through projective techniques such as the Thematic Apperception Test (TAT; Murray, 1938), Cottle's Circles Test (Cottle & Klineberg, 1974), or Time Lines (Rappaport, 1990). However, these instruments often demonstrated poor reliability and questionable construct validity (see Lasane & O'Donnell, 2005, for a review). More recent attempts have taken a direct approach through the development of inventories and questionnaires. A drawback of a number of these measures is that they either do not consider multiple temporal regions, or they fail to incorporate multiple dimensions of temporal perspective. For instance, the Consideration of Future Consequences scale (CFC; Strathman, Gleicher, Boninger, & Edwards, 1994) and the Future Anxiety Scale (Zaleski, 1996) neglect the influence of past and present temporal regions.

The most widely used measure of temporal perspective has been the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999). Through exploratory factor analysis a five-factor structure emerged that combined the dimensions of temporal orientation and attitude. The time perspective factors included: (a) past-negative; (b) past-positive; (c) present-hedonistic; (d) present-fatalistic; and (e) future. The ZTPI measures the extent that individuals are cognitively biased toward these 'time perspectives' and is believed to be a relatively stable individual difference variable. For example, those scoring high in future orientation are believed

to possess a bias whereby their cognitive structures are consistently dominated by future events and outcomes (i.e., goals or rewards).

The measure has shown good predictive ability and has been adopted by many as the common measure used in time perspective research. However, in spite of its popularity there are several shortcomings that discourage its use. While exploratory factor analysis supported a five-factor structure, this model has repeatedly demonstrated poor fit using confirmatory factor analysis (see Shipp, Edwards, & Lambert, 2009; Worrell & Mello, 2007). In addition, up to 80% of the items have been shown to significantly cross-load onto other factors. The factors are also highly correlated with other constructs, bringing into question the independence of these factors. For example, the correlation between the future factor and consciousness has been as high as .89 (Shipp et al., 2009); the present-hedonistic factor is highly correlated with risk-taking and sensations seeking (.65 and .57 respectively); and the present-fatalistic factor correlates with chance locus of control (.82; Shipp et al., 2009). A potential reason for the redundancy between the time perspective factors and these other constructs is due to the nature of the items. Most of the items do not represent a cognitive orientation toward the temporal regions, but rather ask how characteristic certain behaviours are of the respondent (e.g., "I take risks to put excitement in my life"). Such behaviours seem to reflect other constructs more than a cognitive bias toward specific temporal regions. For these reasons the current research will stray away from use of the ZTPI and aim to reflect the temporal perspective dimensions individually.

Despite inconsistencies in how temporal perspective has been conceptualized and measured, there is relative consensus that temporal perspective involves multiple dimensions that includes both a cognitive component and an affective, or evaluative component (Boniwell, 2009; Jones, 1993; Kazakina, 1999; Lennings, 1996; Zimbardo & Boyd, 1999). The dimensions that

commonly fall under the temporal perspective blanket are temporal focus (or orientation), temporal attitude (or emotional valance), and temporal distance (or extension/depth). Each of these dimensions represents a different manner in how time is perceived within specific temporal regions. We continue the work of these researchers by incorporating a multidimensional approach to understanding the subjective aspects of temporal perspective. This approach allows each dimension to be clearly defined and operationalized in order to understand their unique contributions to predicting well-being. Attention will now be turned to the conceptualization of each of the temporal perspective dimensions and the sparse research relating to well-being.

Temporal Focus

The majority of recent research on temporal perspective has been concerned with the influence of possessing a general temporal focus, which has been shown to be an important predictor for a variety of outcomes. *Temporal focus* can be defined as attention that is directed toward the temporal regions of past, present, or future (Shipp et al., 2009). An individual can allocate attention to any of the temporal regions to varying degrees of frequency. Temporal focus has often been used interchangeably with temporal orientation. While there is considerable overlap between the two terms, temporal orientation often implies that we are predominantly oriented toward a single region (e.g., future) and neglect the other two. Research has often followed this assumption by only focusing on individuals with extreme orientations, grouped by way of median splits (e.g., Harber, Zimbardo, & Boyd, 2003; Lasane & Jones, 1999). This negates the possibility that an individual may focus on multiple regions equally over time. Thus, the term temporal focus is adopted to assert that focus may change from moment to moment and over time (Shipp et al., 2009).

Most early research on temporal focus revolved around the tendency to be oriented toward the future (De Volder & Lens, 1982; Nuttin, 1985). A focus on the future has been shown to directly relate to a variety of desirable outcomes, such as academic achievement (De Volder & Lens, 1982), motivation (Nuttin, 1985), socioeconomic status (Guthrie, Butler, & Ward, 2009; Lamm, Schmidt, & Trommsdorff, 1976), impulse control (Zimbardo & Boyd, 1999), purpose in life, and optimism (Boniwell, Osin, Linley, & Ivanchenko, 2010). Future focus has also been inversely related with several undesirable outcomes, such as substance use (Apostolidis, Fieulaine, Simonin, & Rolland, 2006; Keough, Zimbardo, & Boyd, 1999; Wills, Sandy, Yaeger, 2001), risk taking (Zimbardo & Boyd, 1999), depression and hopelessness (Breier-Williford & Bramlett, 1995).

Research on present and past focus has received far less attention within the time perspective literature than future focus. The desirability of a present focus has been debatable, with some research demonstrating that present focus is directly associated with risk taking behaviours, such as increased substance use (Apostolidis et al., 2006; Keough et al., 1999; Wills et al., 2001), driving speeds (Zimbardo, Keough, & Boyd, 1997), and unsafe sexual activity (Rothspan & Read, 1996). Other research has found present focus to be related to desirable traits, such as optimism (Lennings, 2000; Boniwell et al., 2010) and creativity (Mainemelis, 2002). Research on both past and present focus has been equivocal, which can be largely attributed to the use of measurement instruments with questionable psychometric properties (e.g., ZTPI). Nevertheless, the importance of temporal focus in predicting many meaningful life outcomes (e.g., success, health behaviours), would suggest that it is also important in understanding happiness and well-being.

Temporal focus and well-being. There has been a considerable amount of research demonstrating the benefits of focusing on the future (Boyd & Zimbardo, 2005). However, the emphasis on achievement and rewards that accompanies a future focus brings into question if a future focus promotes happiness and well-being. A future focus has consistently failed to be associated with happiness (Boniwell et al., 2010; Drake, Duncan, Sutherland, Abernethy, & Henry, 2008; Zimbardo & Boyd, 1999) and weakly associated with life satisfaction (Boniwell et al., 2010; Shipp et al., 2009). Though it has been associated with increased positive affect (Kazakina, 1999; Shipp et al., 2009) and energy (Zimbardo & Boyd, 1999), it has also been associated with increased negative affect (Kazakina, 1999). There is considerable research to suggest that emphasizing external success does not improve well-being (Myers, 2000; Sheldon, Ryan, Deci, & Kasser, 2004). It could be that a focus on the future brings success, but at a cost to enjoying the experiences now.

A present focus may be crucial in experiencing well-being and happiness. Happiness exists in the moment, so a failure to attend to the present moment may preclude one's ability to engage in this experience. The proverbial expression that 'it is the journey, not the destination that matters' provides insight that focusing on future outcomes take away from appreciating and enjoying the process of living. Beyond common expressions, many philosophical and religious teachings speak to the benefits of living in the moment (e.g., Buddhism and Taoism; Kessler, 2001). Research investigating concepts such as mindfulness and flow also advocate for the necessity of a present moment awareness for realizing optimal functioning and happiness (Brown & Ryan, 2003; Csikszentmihalyi, 1990). Unlike future focus, a general tendency to focus on the present has consistently related to increased happiness (Boniwell et al., 2010; Drake et al., 2008; Zimbardo & Boyd, 1999), life satisfaction (Shipp et al., 2009), positive affect (Boniwell et al.,

2010; Kazakina, 1999; Shipp et al., 2009), and energy (Zimbardo & Boyd, 1999). Even though these are only zero-order correlations, there is reasonable support to suggest the importance of being present in order to experience well-being.

There have been even fewer investigations into the importance of focusing on the past in understanding well-being. Some areas of research support that a constant focus on the past does not contribute to experiencing well-being. For instance, research on regret and rumination provide evidence of the undesirable association between past focus and well-being (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2003). However, research on positive reminiscence has shown that thinking about the past can have a positive impact on mood (Bryant, Smart, & King, 2005). Within the temporal perspective literature research has found a direct association between past focus and anxiety, global distress, depression (Kazakina, 1999), and negative affect (Kazakina, 1999; Shipp et al., 2009). Conversely, an inverse relationship has been found between past focus and life satisfaction (Kazakina, 1999; Shipp et al., 2009) and subjective well-being (Litvinovic, 1998). Thus, when considering simple relationships, past focus appears to relate negatively to well-being.

Due to the limited research that is available, the influence of temporal focus on well-being is not very straightforward. Despite the potential dangers that have been associated with a present focus (Keough et al., 1999), there is enough research to suggest that a present focus plays an important role in understanding well-being. Whereas, the influence of past and future focus on well-being is less clear. However, there is more to understanding the impact of temporal perspective on well-being than only considering the temporal region that one predominantly focuses their thoughts and attention toward. The affective nature of the thoughts within each temporal region is also influential. The impact of temporal attitudes will be discussed next.

Temporal Attitude

Temporal attitude is the affective component of temporal perspective and refers to one's attitude toward the content within each of their past, present, and future temporal regions (Nuttin, 1985). When our thoughts exist within a specific temporal region, these thoughts can be considered to be positive or negative. Thus our attitude toward the thoughts that occupy the temporal regions makes up our temporal attitudes. Consistently focusing on thoughts of a particular valence within a temporal region (e.g., negative past) has a meaningful impact (Zimbardo & Boyd, 1999). Temporal attitude is believed to be independent of temporal focus, in that the thoughts of any region could be considered positive or negative.

The nature in which one's temporal thoughts are tilted to be either positive or negative has a dramatic impact on the individual. For example, focusing on the past in a negative way has been shown to be considerably different to a positive past focus. Individuals with a past negative focus show higher levels of aggression, depression, and anxiety, and lower levels of impulse control and self-esteem. Whereas, a past positive focus show nearly the reverse findings, with less aggression, depression, and anxiety, and higher self-esteem (Kazakina, 1999; Zimbardo & Boyd, 1999). Differences between a positive future temporal attitude and a negative one (e.g., future anxiety; Zaleski, 1996) have also been considerable, but with much less frequency.

Temporal attitude and well-being. The relationship between temporal attitude and well-being appears to be quite straightforward. All research examining these constructs consistently finds that possessing positive temporal attitudes toward each of the past, present, and future is more beneficial than having negative temporal attitudes. For example, a positive past temporal attitude has related to increased happiness (Drake et al., 2008; Zimbardo & Boyd, 1999), life satisfaction, positive affect (Kazakina, 1999, Shipp et al., 2009), and subjective well-being

(Litvinovic, 1998), as well as decreased negative affect (Shipp et al., 2009) and global distress (Kazakina, 1999). Positive evaluations of present and future focus have found similar relationships (Kazakina, 1999; Litvinovic, 1998; Shipp et al., 2009). Thus, the notion that temporal attitudes are important for understanding well-being is well supported.

Temporal Distance

Temporal distance, also referred to as temporal extension or temporal depth, is defined as the distance away from the present moment that an individual's thoughts span. This distance can stretch into the past or the future (Bluedorn, 2002). Thus, one who consistently focuses their thoughts on an event five years into the future would have a greater future temporal distance than one who is predominantly concerned with a week into the future. The past temporal distance operates similarly, where a focus on the distant past indicates greater past temporal distant than a focus on the near past. Of the temporal perspective dimensions included in this investigation, temporal distance is the most sparsely researched. However, the distances that one projects their thoughts into the past or future has the potential to be influential in understanding how temporal perspectives predict well-being.

Temporal distance and well-being. The few studies that have included temporal distance as a predictor of well-being have not yielded consistent findings (Kazakina, 1999; Shipp et al., 2009; Zaleski, Cycon, & Kurc, 2001). Nonetheless, other research offers indirect evidence as to how temporal distance may influence well-being. When temporal distance is increased (regardless of past or future), the level of abstraction also increases in that thoughts become more vague and less concrete (Dhar & Kim, 2007). When past temporal distance is increased it is likely to lose the emotional impact that focusing on a proximal past carries with it. Strack, Schwarz, and Gschneidinger (1985) found that when participants were instructed to focus on a

negative event of the distant past their current life satisfaction was higher than when they focused on a negative event of the recent past. In addition, their current mood was unaffected only when temporal distance was greater. Thus, distant past focus does not appear to emotionally impact us in the same way that proximal past focus does. When considering our current life circumstance, a focus on a distant past that was worse made the current circumstance seem good by comparison. However, when focus was on a negative recent past it became incorporated into their current circumstance and reduced their evaluation of it. The past distance relationship with well-being may be complex and depend on more than when the contents of the thoughts took place.

Future temporal distance may operate differently than past distance in predicting well-being. A constant focus on the distant future may prevent one from making their life optimal in the present. Two areas of research show support for this claim. In a study of temporal scarcity, college seniors were led to believe that they either had a long time until graduation (distant future) or that graduation was close (proximal future). It was found that those who were led to focus on the nearness of graduation became more engaged in their school activities, social outings, and enjoyed their experience more than those who had a distant view of graduation (Kurtz, 2008). Similarly, populations who believe they do not have much time remaining to live (e.g. AIDS patients, elderly people), thus negating their thoughts of the distant future, are found to maximize the positive aspects of their current experiences (Carstensen, Isaacowitz, & Charles, 1999).

The other study asked participants to rate their life satisfaction five years into the past, at the present time, and five years into the future (Busseri, Choma, & Sadava, 2009). It was found that those who had the greatest upward trajectory (i.e., viewing the present better than the past

and the future as better than the present) showed worse psychological adjustment and well-being both at the present time and five years into the future. Thus, the focus on the distant future as improving may prevent people from actively engaging to make their life better now. In this way a distant future focus may be detrimental to well-being by enabling people to endure unpleasant current circumstances in hopes that the future will be better.

What is Considered Well-Being?

A key area for concern when using well-being in a research program is how well-being is being conceptualized. Most of the research presented thus far relating temporal perspectives to well-being included only subjective well-being (SWB), also occasionally referred to as hedonic well-being (HWB). Subjective well-being is a composite measure of the balance between positive and negative affect in combination with life satisfaction, whereas hedonic well-being is simply the relative dominance of positive affect over negative affect. However, there is much debate within the well-being literature as to whether there is more to happiness than simply experiencing more positive feelings relative to negative ones. In order to reflect a more complete picture of what it is to be optimally functioning, researchers have begun to include another form of happiness into their conceptualization of well-being, often referred to as eudaimonic well-being or psychological well-being (PWB; Ryff, 1989), characterized as living a life where one actualizes their human potentials (Ryan, Huta, & Deci, 2008). This form of well-being involves the process of living well in addition to experiencing positive affective states (see Ryan & Deci, 2001, for review of distinction between eudaimonic and hedonic well-being).

Research on what it means to be optimally functioning is still in its infancy, and there are still issues revolving around the operationalization and measurement, leading some to question the utility of including such a conceptualization (see Kashdan, Biswas-Diener, & King, 2008;

Waterman, 2008, for more thorough discussion). However, in order to understand a life that is thriving optimally, more than positive and negative affect need to be considered. The current research adopts a conceptualization of optimal functioning that includes both affect and psychological well-being. One of the major proponents of a fuller conceptualization of well-being is self-determination theory (SDT), which states that optimal functioning is achieved through the satisfaction of three basic psychological needs – autonomy, competence, and relatedness (Ryan et al., 2008). Our conceptualization of psychological well-being incorporates SDT as well as other aspects of flourishing, such as vitality, and personal expressiveness (Waterman, 1993). No research to date has examined how temporal perspective relates to psychological well-being, despite a call for its inclusion in temporal perspective research (Sheldon & Vansteenkiste, 2005). The relationships between temporal perspective and SWB may operate differently than PWB. For instance, psychological well-being may best be predicted by a combination of future focus and present focus (Sheldon & Vansteenkiste, 2005).

The benefits of combining temporal perspectives have been proposed frequently with much speculation that the ideal relationship with well-being involves a balanced temporal perspective (Boniwell, 2009; Boyd & Zimbardo, 2005; Boniwell & Zimbardo, 2004). Like time perspective in general, a balanced temporal perspective has been conceptualized in a number of different ways. The most consistent conceptualization of a balanced temporal perspective involves a blend of focusing on the past, present, and future depending on the situation at hand, but doing so in a positive manner (Boniwell & Zimbardo, 2004; Litvinovic, 1998). “In an optimally balanced time perspective, the past, present, and future components blend and flexibly engage, depending on a situation’s demands and our needs and values” (Zimbardo, 2002, p. 62).

Despite numerous claims that this balanced temporal perspective is ideal for optimal functioning and overall well-being (Boniwell, 2009; Boniwell & Zimbardo, 2004), there have been very few attempts to empirically evaluate them. The few attempts that have been made defined a balanced temporal perspective as being high in a global measure of focusing on a positive past, present, and future. However, individuals were merely classified into the *balanced* category based on a single measurement occasion. This has either been accomplished by way of median splits (Drake et al., 2008) or performing cluster analyses on the ZTPI to identify profiles that correspond to a balanced temporal perspective (Boniwell et al., 2010). Though the latter approach was more successful in identifying a representative proportion of people who were classified as 'balanced' (23% of sample *versus* only 5% using median splits), a balanced temporal perspective was still based on a single measurement point. If a balanced temporal perspective is to be considered one which individuals have the capacity to flexibly switch their focus to a suitable temporal region then this construct cannot be captured by way of single measurement point designs. In order to address how a balanced temporal perspective operates (and even if it is a possibility), a new research design that uses repeated measures should be introduced into temporal perspective research.

Daily Diary Research

The use of intensive repeated measures designs has become increasingly popular in social and personality psychology as a way to measure an individual's everyday experience as it is lived (Reis & Gable, 2000). Though there are a number of forms these designs can take, a common one used in well-being research is the daily diary design, whereby participants record their daily experiences at the end of each day for a certain number of days (typically 14 days; Bolger, Davis, & Rafaeli, 2003).

This type of design has several advantages in the measurement of well-being over designs that use a global measure taken at a single point in time. One of the clear advantages is that retrospection bias is reduced when only having to recall the experiences of the day as opposed to recalling experiences in general (Bolger et al., 2003; Reis & Gable, 2000). Another advantage of daily diary designs is the richness of information that is obtained. Rather than assuming that a general level of well-being taken from a single measurement is representative of how life is lived, the daily diary design allows us to account for the deviations from general levels in meaningful ways. Because life is lived day-by-day, it is these ongoing experiences, the ups and downs, that combine to make up our overall well-being (White & Dolan, 2009). Thus, it is important to understand the daily fluctuations that occur within an individual's lives and to try to predict and account for these fluctuations (Reis, et al., 2000; Sheldon, Ryan, & Reis, 1996). Finally, diary designs provide the ability to determine the stability of so-called dispositional traits. Through the use of multiple repeated measures, trait characteristics can be examined for their stability over time in ways that cannot be accomplished with global measurements taken at one point in time (Nezlek, 2007).

In the same way that daily diary designs have advanced research on well-being, so too can they apply to temporal perspective research. Global assessments of temporal perspective are likely to be extremely susceptible to retrospection bias. Recalling our general perception of time, whether it is our temporal focus, attitude, or distance, can be problematic when we are so far removed from the actual experience. Thus, having respondents recall their temporal perceptions of shorter intervals (i.e., within the same day) will be critically important in the accuracy of recalling temporal perspectives.

A key issue in understanding temporal perspective involves the stability of this construct. Though Zimbardo & Boyd (1999) claim that temporal orientations are stable trait characteristics, they also advocate for a balanced temporal perspective that involves flexibility across situations (Boniwell & Zimbardo, 2004; Zimbardo, 2002). Test-retest reliability of temporal perspective measures (e.g., Temporal Focus Scale) usually falls in the range of 0.70 to 0.80. However, differences in pre- and post-test may not be due solely to measurement error, but rather reflect systematic within-person fluctuations (Willett, 1988). The inclusion of an intensive repeated measures design, such as daily diary, is necessary to determine the stability of the temporal perspective construct. If a balanced temporal perspective is what is ideal, and if "[f]lexibility and 'switch-ability' are essential components of a balanced TP [temporal perspective]" (Boniwell & Zimbardo, 2004, p. 172), then determining the stability through repeated measures is a crucial step that needs to be taken to fully understand if a balanced temporal perspective is possible.

Present Study

The present study attempted to extend the research on temporal perspective in a number of ways. The first was to introduce an advanced research design (daily diary) to investigate the dimensions of temporal perspective (*temporal focus*, *temporal attitude*, and *temporal distance*). Such a design provides many benefits that have yet to be utilized in the research area of temporal perspective (see above). Secondly, to provide a more thorough investigation of the relationships between temporal perspective and well-being than has previously been accomplished. To date, most of the research relating temporal perspective to well-being has only considered zero-order correlations. Also, well-being measures have typically only included measures of subjective well-being, ignoring the burgeoning body of research involving psychological well-being. The present study took a multi-dimensional approach to defining temporal perspective and examined

the dynamic day-to-day relationships between each dimension and both subjective and psychological well-being. Lastly, examining day-to-day fluctuations in temporal perspective allowed us to test people's capacity to be flexible, which is an important initial step toward understanding if people possess the potential to have a *balanced temporal perspective*.

Based on the above extensions to the current field of time perspective research, the two research goals of the present study were: (i) To address whether the constructs of temporal focus, attitude, and distance fluctuate within an individual across time (14 days), demonstrating flexibility in people's temporal perspectives; and (ii) to better understand the relationships between temporal perspective and well-being, by systematically investigating the dynamic relationships as they occur in day-to-day experiences, and to extend this understanding to a more full conceptualization of well-being that includes not only affect, but also PWB.

It was hypothesized that individuals would demonstrate significant amounts of variability in all dimensions of temporal perspective. That is, the amount that people focus on the past, present, and future would significantly fluctuate from their average levels. Similarly, individuals would vary in their daily evaluations of the past, present, and future. They were also expected to fluctuate in the distance of both past and future thoughts.

Regarding the relationships between daily temporal perspective and well-being the following hypotheses are put forth. First, present temporal focus is believed to be a necessary component of experiencing daily well-being and will be an important predictor of both affect and psychological well-being. Conversely, daily past focus is expected to show a weak inverse relationship with well-being. Finally, future focus is not expected to predict daily affect, because a focus on the future often results on sacrificing momentary pleasures. However, psychological

well-being may be weakly predicted by a future focus, which often results in self-regulation and impulse control that may be integral in the positive experiences associated with PWB.

Positive temporal attitudes toward each of the past, present, and future temporal regions were expected to predict increased daily well-being. The influence of temporal distance on well-being was the most exploratory and hypotheses regarding this dimension of temporal perspective are largely speculative. However, it was predicted that an extensive focus on the near past is detrimental to well-being. Conversely, a frequent focus on the distant future will negatively predict well-being outcomes. Each of these hypotheses is offered with some reservation, since this is the first study to examine how fluctuations in temporal perspective predict daily well-being.

Method

Participants

One-hundred-nineteen undergraduate students (30 males; 89 females) from a western Canadian university participated in the current study. They were recruited through a research participation system in exchange for extra credit in a psychology course. The description provided to potential participants was that the study was examining day-to-day thoughts, feelings, and experiences. The age for the sample ranged from 17 to 45 years (M_{age} = 20.0 years, SD = 3.68).

Procedure

The study took place during the first 3 weeks of the fall semester (September). It consisted of an initial instruction session, followed by a two-week (14-day) daily diary portion. The initial session was conducted in a laboratory setting at the university, where participants were provided with informed consent and completed a preliminary questionnaire consisting of

demographic information and other measures not relevant to this study. During this session the protocol for completing the daily diary portion of the study was explained.

The daily diary component was completed through an online diary that was hosted on a local server. The daily diaries consisted of daily measures of temporal perspective and well-being, and were to be completed each evening for 14 consecutive days. Participants were only able access to the diary questionnaire between the hours of 5:30 p.m. and 11:30 p.m. Diaries that were not completed during that period were considered missing. Due to the susceptibility of retrospection bias with the constructs being measured (e.g., temporal focus), it was important to ensure that the diaries were being completed each evening and not several days later. This was a major advantage in using an online daily diary instead of an alternate form, such as paper booklets.

Daily emails were sent out each evening around 5:20 p.m. with a link to the online diary website. These emails served as a reminder for participants, but also reduced the effort required of them, in that they could just click on the link and begin. Of a possible 1666 daily occasions (119 participants X 14 days), data for 1329 days was obtained (80%).

Daily Temporal Perspective Measures

Temporal focus. In order to develop a daily measure of temporal focus, one item for each of past, present, and future was adapted from the Temporal Focus Scale (TFS; Shipp et al., 2009). The advantage that the TFS has over other measures of temporal focus is that the items strictly address the cognitive focus on each temporal region, rather than measuring behaviours, which are often used as a proxy for temporal focus (e.g., ZTPI), but which often reflect other constructs (e.g., risk-taking, conscientiousness) more than temporal focus.

Participants were asked to consider what their thoughts and attention was focused on in the last 24 hours and then indicate how often they were focused on the past ("How often did you think about things that had occurred in the past?"), present ("How often were you focused on what was happening in the moment?"), and future ("How often did you think about things that are to come in your future?") on a scale from 1 (*never*) to 9 (*constantly*).

Temporal attitude. Participants described two things/events from the past and two from the future that they had frequently thought about or focused on during the last 24 hours. To assess past and future attitude, they then rated how pleasant they considered their thoughts about each event to be from 1 (*very unpleasant*) to 9 (*very pleasant*). To assess present attitude, participants described two things that they were focused on in the moment during the last 24 hours and rated whether they considered each to be unpleasant/pleasant on the same 9-point scale. A daily past, present, and future attitude score was computed by averaging across the respective scales.

Temporal distance. The same four events (2 past; 2 future) that were used to assess past and future attitude, were also used to assess past and future distance. For past distance, participants identified how long ago each event took place on a 6-point scale (1 = *within the last few days*, 2 = *a few weeks ago*, 3 = *a few months ago*, 4 = *several months ago*, 5 = *about 1 year ago*, 6 = *many years ago*). For future distance, participants identified how far into the future each event took place on a similar 6-point scale (1 = *later this week*, 2 = *a few weeks from now*, 3 = *a few months from now*, 4 = *several months from now*, 5 = *about 1 year from now*, 6 = *many years from now*). Daily past and future distance scores were computed by averaging across the two past thoughts and two future thoughts, respectively.

Daily Well-Being Measures

Affect. Positive and negative affect was measured with the Scales of Positive and Negative Experiences (SPNE; Diener et al., 2010), which included 8 positive (e.g., *positive, contented, joyful*) and 8 negative (e.g., *negative, sad, stressed*) items. Participants indicated the extent they felt each emotion over the last 24 hours from 1 (*very little or not at all*) to 5 (*extremely*). One of the advantages of using the SPNE in a daily diary design is that it asks about general emotions that are more likely to capture the overall feeling of the day, rather than asking about specific feelings. People are unlikely to experience every specific emotion each day, thus using more generalized items allows for the actual experience of the day (positive *vs.* negative) to be captured, while also limiting the number of items that need to be asked (i.e., the participant is not burdened with a long list of every possible emotion). In addition to the daily PA and NA scores, a composite daily affect balance score was computed by subtracting daily PA from NA (Affect Balance = PA – NA, scores ranging from -4 to +4).

Psychological well-being. A new measure was created to assess daily psychological well-being. This scale was comprised of items adapted from established global measures of optimal functioning. Five items were taken from the Flourishing Scale (FS; Diener et al., 2010), that captured the major components of psychological well-being (e.g., *relatedness, competence, engagement, meaning*). Four additional items were included to capture the remaining components of optimal functioning, such as autonomy, vitality (Ryan & Frederickson, 1997), and personal expressiveness (Waterman, 1993). Thus, our daily measure of PWB consisted of nine items, which were rated on a scale from 1 (*not at all*) to 7 (*very much*) based on the extent participants felt that way during the last 24 hours, with higher scores reflecting greater

psychological well-being. The order of the items within each well-being scale (SPNE and PWB) was randomly presented each day, to eliminate any order effects that may occur.

Data Analytic Strategy

The nature of the daily diary design makes the use of a multilevel modeling (MLM) approach desirable. Multilevel modeling handles the hierarchical structure of diary data in which daily measurement occasions are nested within people. Multilevel models have several advantages in dealing with daily diary measures over more traditional ordinary least squares (OLS) procedures. One of the major shortcomings of using OLS is that it assumes that observations are independent and thus is not suitable to handle the repeated diary measures that are surely correlated within the individual (Singer & Willet, 2003). Multilevel modeling does not require observations to be independent and is able to handle the hierarchical nature of the nested variables.

Another advantage of using MLM is that it estimates the random effects, which allows for the intraindividual variability to be systematically modeled at the day-level (Level 1) and the interindividual variability to be modeled at the person-level (Level 2). That is, within-person fluctuations (i.e., deviations from their personal mean) across days can be estimated and accounted for in a systematic manner. Similarly, deviations between each individuals average estimates (e.g., intercept and slope) and the population average can also be estimated and accounted for in meaningful ways. In contrast, OLS techniques only estimate the fixed effects, where all deviations from the average are considered error.

For the present study, it is the daily within-person fluctuations that are of primary interest in attempting to understand the day-to-day processes of temporal perspective and its relationship with well-being. Thus, the use of MLM in combination with the daily diary research design

allowed for the goals of the present study to be accomplished: (i) To address whether temporal perceptions fluctuate within an individual across time; and (ii) to understand the dynamic relationship between daily temporal perspective and well-being. The second goal is accomplished with within-person coupling procedures (Hofer & Sliwinski, 2006), in which daily fluctuations in well-being are accounted for by daily fluctuations in temporal perspective. Thus, the covariation (i.e., coupled relationship) between variables on a day-by-day basis gives an indication that the variables travel together, such that a deviation in one variable is reliably associated with a deviation in the other.

Hierarchical Linear Modeling 6.08 (HLM; Raudenbush & Bryk, 2002) software was used to fit the multilevel models, which were estimated using full information maximum likelihood (FIML) for robust standard errors. FIML uses all available data to estimate both the fixed and random effects.

Results

The results are presented in two parts. The first part addresses the amount of within- and between-person variability in both the temporal perspective variables (*focus, attitude,* and *distance)* and the well-being variables (*PA, NA, affect balance,* and *PWB*). The second part examines the within-person coupling relationships between temporal perspective variables and each of the well-being variables. Descriptive statistics and intercorrelations for the aggregated daily variables are presented in Table 1.

Within-Person Variability

Temporal perspective variables. A first step was to use MLM to fit an unconditional means model for each temporal perspective variable: *focus* (past, present, and future); *attitude* (past, present, and future); and *distance* (past and future). The unconditional means model

Table 1

Means, Standard Deviations, and Between-Person Intercorrelations of Aggregated Daily Variables.

Variable	*M*	*SD*	Correlation										
			1	2	3	4	5	6	7	8	9	10	11
1. Mean daily past focus	3.78	1.34	---										
2. Mean daily present focus	6.50	1.22	-.16†	---									
3. Mean daily future focus	5.68	1.40	.54***	-.04	---								
4. Mean daily past attitude	5.53	1.45	.03	.01	.10	---							
5. Mean daily present attitude	6.00	1.04	.02	-.02	.02	.19*	---						
6. Mean daily future attitude	5.75	1.14	.06	.16†	-.00	.43***	.38***	---					
7. Mean daily past distance	3.09	1.02	.17†	-.05	-.01	.23*	.03	.14	---				
8. Mean daily future distance	2.38	0.82	.26**	-.15†	.05	.09	.07	.21*	.48***	---			
9. Mean daily PA	3.28	0.57	-.13	.16†	-.08	.30***	.42***	.37***	.12	.12	---		
10. Mean daily NA	1.83	0.55	.27**	-.26**	.24**	-.27**	-.34***	-.36***	.03	.09	-.53***	---	
11. Mean daily Affect Balance	1.46	0.98	-.23*	.23**	-.18*	.33***	.44***	.42***	.05	.02	.88***	-.87***	---
12. Mean daily PWB	4.92	0.80	-.06	.35***	-.02	.16†	.37***	.38***	-.01	.04	.76***	-.49***	.72***

Note. $N = 119$. PA = positive affect; NA = negative affect; Affect Balance = PA – NA; PWB = psychological well-being.
$^{\dagger}p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

enables variability in each temporal perspective variable to be partitioned into within- and between-person (Singer & Willet, 2003) and is represented in the following equations:

Level 1:

$$Y_{ij} = \beta_{0i} + r_{ij} \quad (1a)$$

Where Y_{ij} is the temporal perspective score for person *i* on day *j*; β_{0i} is the mean-level for person *i*, across the 14 days; and r_{ij} represents the residual within-person variance, that is, the daily fluctuations around their personal mean.

Level 2:

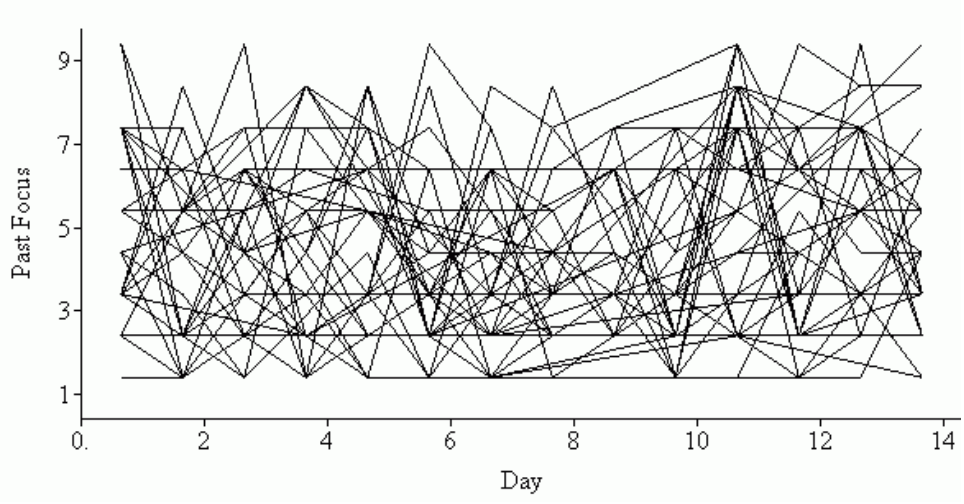
$$\beta_{0i} = \gamma_{00} + u_{0i} \quad (1b)$$

Where γ_{00} is the mean temporal perspective score (grand-mean), and u_0 represents the person-specific deviations of person *i*'s mean from the population mean (i.e., the between-person variability). The calculation of the intraclass correlation coefficient (ICC; Singer & Willet, 2003), which divides the between-person variance (σ^2_0) by the total variance ($\sigma^2_0 + \sigma^2_r$), gives an indication of the amount of between-person variability. The remaining proportion of the variability (i.e., 1 – ICC) provides an indication of the amount of within-person variability.

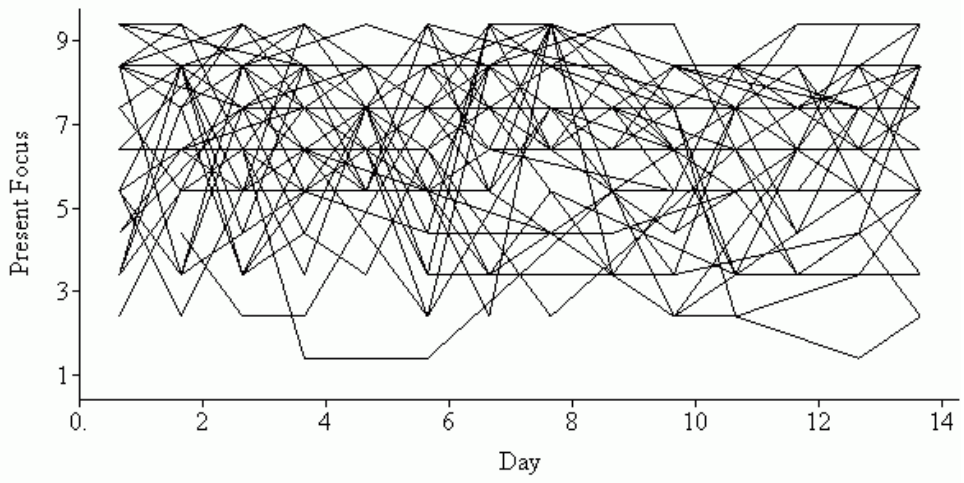
All eight of the temporal perspective variables had significant amounts of within-person variability (*p*s < .001). Approximately two-thirds (69%, 64%, and 63%) of the total variance in past, present, and future focus was located within persons, respectively. That is, people fluctuated more from themselves in their temporal focus than they did from each other. Figure 1 displays the intraindividual trajectories of day-to-day temporal focus.

The other temporal perspective variables displayed a similar pattern. Within-person variability in past, present, and future attitude amounted to around three-quarters of the total

A)



B)



C)

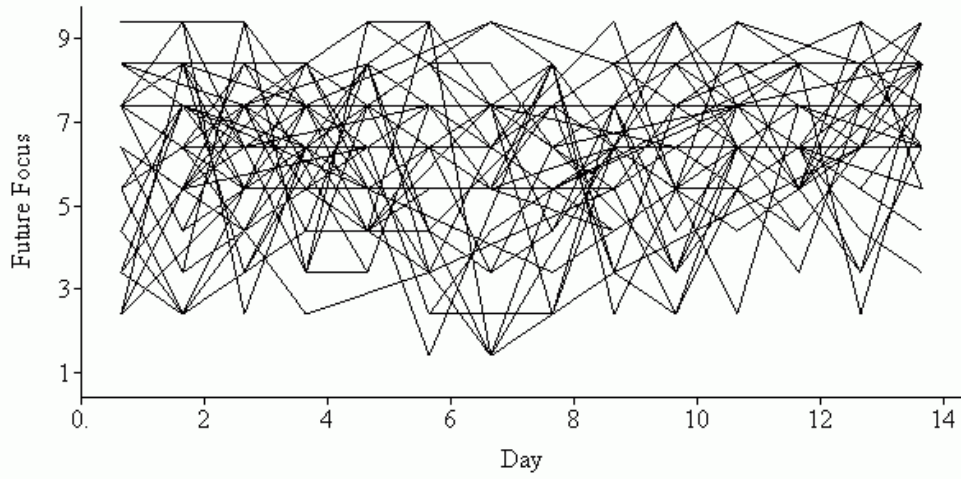


Figure 1. Fourteen-day trajectories of temporal focus for a random one-third of sample (*N* = 40). Panel A: Trajectories of past focus. Panel B: Trajectories of present focus. Panel C: Trajectories of future focus.

variability (69%, 76%, and 78%, respectively). Past and future distance had 69% and 74% of their variability located within persons, respectively. Thus, individuals were demonstrating more intraindividual differences in temporal perspective than interindividual differences.

Well-being variables. Unconditional means models were also fit with the four well-being variables (*PA, NA, Affect Balance,* and *PWB*) as outcomes. In addition to determining the proportion of within- to between-person variability in each variable, fitting the unconditional means model also indicates if there is significant within-person variability remaining unaccounted for. Because the intention is to account for the within-person (day-level) variability in well-being, it is important to first identify that there is indeed variability unaccounted for prior to fitting the dynamic coupling models.

The intraclass correlation indicated that the within-person variability in PA and NA amounted 62% and 53% of the total variance, respectively. Similarly, 59% and 62% of the total variance in affect balance and PWB was located within-persons, respectively. Similar to the temporal perspective variables, individuals varied more from themselves on all well-being measures than they did from others. The residual intraindividual variability was also significant for all well-being variables (*p*s < .001), indicating that there is unexplained variability at the within-person (daily) level that other daily predictors (e.g., temporal perspective) could account for.

Within-Person Relationships between Daily Temporal Perspective and Well-Being

Temporal focus and well-being. To account for the dynamic daily relationship between temporal focus and well-being, the same MLM was fit separately for each of the four well-being outcomes (*PA, NA, Affect Balance*, and *PWB*). The following equation represents the within-person coupling model of temporal focus and well-being:

$$WB_{ij} = \beta_{0i} + \beta_{1i}(\text{past focus}_{ij}) + \beta_{2i}(\text{present focus}_{ij}) + \beta_{3i}(\text{future focus}_{ij}) + \beta_{4i}(\text{day}_{ij}) + r_{ij} \quad (2a)$$

The daily temporal focus variables were group-mean centered on each person's mean to control for individual differences in mean level (Nezlek, 2001). Day was included to control for any linear trends due to time, and was centered on the first day of testing. Thus, WB_{ij} represents the well-being score for person i on occasion j; β_{0i} refers to the intercept, which is interpreted as the predicted well-being score on the first day of assessment for an average occasion of past focus, present focus, and future focus for person i; β_{1i} through β_{3i} represent the slope coefficients for daily past, present, and future focus (i.e., the within-person relationship between daily temporal focus and daily well-being), respectively; β_{4i} represents the linear time-related slope; past focus_{ij}, present focus_{ij}, and future focus_{ij} represent the scores on the respective measures for person i on occasion j; and r_{ij} represents the within-person residual variance in daily well-being.

At the between-person level, both intercepts and slopes were modeled as random coefficients to allow for individual differences in initial levels and within-person relationships between temporal focus and well-being. Mean levels of past, present, and future focus were entered as covariates to the random intercept in order to remove any of the between-person effects. The following equation represents the between-person model for temporal focus:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{mean past focus}_i) + \gamma_{02}(\text{mean present focus}_i) + \gamma_{03}(\text{mean future focus}_i) + u_{0i} \quad (2b)$$

$$\beta_{1i} = \gamma_{10} + u_{1i} \quad (2c)$$

$$\beta_{2i} = \gamma_{20} + u_{2i} \quad (2d)$$

$$\beta_{3i} = \gamma_{30} + u_{3i} \quad (2e)$$

$$\beta_{4i} = \gamma_{40} + u_{4i} \quad (2f)$$

Mean past, present, and future focus was grand-mean centered (i.e., using the sample mean), thus γ_{00} represents the average intercept; γ_{10} to γ_{30} represent the average within-person relationship between past, present, and future focus and well-being, respectively; γ_{40} represents the average linear time-related trend in well-being; γ_{01} to γ_{03} represent between-person associations between average daily well-being and average past, present, and future focus; and u_{0i}, u_{1i}, u_{2i}, u_{3i}, and u_{4i} represent individual variations from average intercepts and slopes (i.e., the random effects).

Table 2 summarizes the results of the within-person coupling models regarding daily well-being and daily temporal focus for each of the four daily well-being measures. Effect sizes were computed for significant predictors by calculating a pseudo R^2 (Singer & Willet, 2003). The residual within-person variance for the full model was compared to the residual variance of a model with the significant level-one predictor removed. The reduction in within-person variance from the trimmed model to the full model can be attributed to the omitted predictor and used as a gross indicator of the effect size (i.e., proportion of variance reduced).

Daily past focus reliably predicted NA (*estimate* = 0.03, $p < .01$) and affect balance (*estimate* = -0.05, $p < .05$) over and above the effects of present and future focus, such that on days when past focus was higher individuals experienced greater negative affect and lower affect balance. Pseudo R^2 statistics indicated that daily past focus accounted for 3.3% and 4.1% of the unique within-person variance in daily NA and affect balance, respectively. Daily present focus reliably predicted PA, NA, affect balance, and PWB (see Table 2). All daily well-being measures were significantly higher (except NA, which was lower) on days with a greater focus on the present (ps < .001), controlling for past and future focus. Overall, daily present focus accounted for 10.0% of the unique within-person variance in PA, 6.6% in NA, 10.3% in affect balance, and 11.4% in PWB. Finally, daily future focus was not a reliable predictor of any of the well-being

Table 2

Multilevel Modeling Analyses of the Within-Person Relationship between Daily Well-Being and Daily Temporal Focus.

	PA		NA		Affect Balance		PWB	
Variable	Estimate[a]	*SE*	Estimate[a]	*SE*	Estimate[a]	*SE*	Estimate[a]	*SE*
Fixed Effects								
Central variables								
Intercept (γ_{00})	3.36***	0.06	1.87***	0.06	1.49***	0.10	4.86***	0.08
Past focus slope (γ_{10})	-0.02	0.01	0.03**	0.01	-0.05*	0.02	-0.01	0.02
Present focus slope (γ_{20})	0.10***	0.02	-0.05***	0.01	0.15***	0.03	0.16***	0.02
Future focus slope (γ_{30})	0.02	0.01	0.01	0.01	0.01	0.02	0.03†	0.01
Control variables								
Linear day slope (γ_{40})	-0.01*	0.01	-0.01	0.01	-0.01	0.01	0.01	0.01
Mean past focus (γ_{01})	-0.05	0.04	0.07†	0.04	-0.11	0.07	-0.03	0.07
Mean present focus (γ_{02})	0.07	0.05	-0.10**	0.04	0.17*	0.08	0.22***	0.06
Mean future focus (γ_{03})	>-0.01	0.04	0.06	0.04	-0.07	0.07	0.01	0.06
Random effects								
Within-person (σ^2_r)	0.36***	0.02	0.25***	0.01	0.94***	0.04	0.72***	0.03
Between-person								
Intercept (σ^2_0)	0.24***	0.05	0.28***	0.05	0.81***	0.15	0.46***	0.09
Past focus slope (σ^2_1)	0.01***	<0.01	<0.01	<0.01	0.01†	<0.01	0.01**	<0.01
Present focus slope (σ^2_2)	0.01**	<0.01	0.01*	<0.01	0.04***	0.01	0.02**	0.01
Future focus slope (σ^2_3)	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01
Linear day slope (σ^2_4)	<0.01**	<0.01	<0.01*	<0.01	0.01**	<0.01	<0.01***	<0.01

Note. Results are based on 1329 daily assessments (N = 119). PA = positive affect; NA = negative affect; Affect Balance = PA – NA; PWB = psychological well-being.

a. Unstandardized coefficients.

$^{\dagger}p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

measures, although, it was marginally associated with daily PWB (*estimate* = 0.03, $p = .08$).

Temporal attitude and well-being. Similar MLM analyses were conducted to examine the daily relationship between temporal attitude and well-being. As with temporal focus, the same multilevel models were fit with each of the well-being variables (*PA*, *NA*, *Affect Balance*, and *PWB*) as the dependent variable. The following equation represents the within-person coupling model of temporal attitude and well-being:

$$WB_{ij} = \beta_{0i} + \beta_{1i}(\text{past attitude}_{ij}) + \beta_{2i}(\text{present attitude}_{ij}) + \beta_{3i}(\text{future attitude}_{ij}) + \beta_{4i}(\text{day}_{ij}) + r_{ij} \quad (3a)$$

As before, the daily temporal attitude variables were group-mean centered on each person's mean to control for individual differences in mean level (Nezlek, 2001). Day was included to control for any linear trends due to time, and was centered on the first day of testing. Thus, WB_{ij} represents the well-being score for person *i* on occasion *j*; β_{0i} refers to the intercept, which is interpreted as the predicted well-being score on the first day of assessment for an average occasion of past, present, and future attitude for person *i*; β_{1i} through β_{3i} represent the slope coefficients for daily past, present, and future attitude, respectively; β_{4i} represents the linear time-related slope; past attitude$_{ij}$, present attitude$_{ij}$, and future attitude$_{ij}$ represent the scores on the respective measures for person *i* on occasion *j*; and r_{ij} represents the within-person residual variance in daily well-being.

Intercepts and slopes at the between-person level were modeled as random coefficients to allow for individual differences in initial levels and within-person relationships between temporal attitude and well-being. Mean levels of past, present, and future attitude were entered as covariates to the random intercept in order to remove any of the between-person effects. The following equation represents the between-person model for temporal attitude:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{mean past attitude}_i) + \gamma_{02}(\text{mean present attitude}_i) + \gamma_{03}(\text{mean future attitude}_i) + u_{0i} \quad (3b)$$

$$\beta_{1i} = \gamma_{10} + u_{1i} \quad (3c)$$

$$\beta_{2i} = \gamma_{20} + u_{2i} \quad (3d)$$

$$\beta_{3i} = \gamma_{30} + u_{3i} \quad (3e)$$

$$\beta_{4i} = \gamma_{40} + u_{4i} \quad (3f)$$

Mean past, present, and future attitude were grand-mean centered. γ_{00} represents the average intercept; γ_{10} to γ_{30} represent the average within-person relationship between past, present, and future attitude and well-being, respectively; γ_{40} represents the average linear time-related trend in well-being; γ_{01} to γ_{03} represent between-person associations between average daily well-being and average past, present, and future attitude; and u_{0i}, u_{1i}, u_{2i}, u_{3i}, and u_{4i} represent individual variations from average intercepts and slopes (i.e., the random effects).

The results of the within-person coupling models regarding daily well-being and daily temporal attitude are presented in Table 3 for each of the four daily well-being measures. As can be seen in Table 3, past, present, and future attitude were significant predictors for each of the well-being outcomes (PA, NA, affect balance, and PWB; *p*s < .01), after controlling for each other. On days when attitudes toward past, present, and future were more positive PA, affect balance, and PWB were all reliably higher and NA was reliably lower. Calculating the pseudo R^2 statistic revealed that daily past attitude accounted for 6.1% of the unique within-person variance in PA, 6.7% in NA, 7.9% in affect balance, and 1.4% in PWB. Daily present attitude accounted for 13.8%, 9.0%, 14.2%, and 22.4% of the unique within-person variability in PA, NA, affect balance, and PWB, respectively. Finally, daily future attitude accounted for 3.5%, 8.6%, 6.1%, and 2.9% of the unique within-person variance in PA, NA, affect balance, and PWB, respectively.

Table 3

Multilevel Modeling Analyses of the Within-Person Relationship between Daily Well-Being and Daily Temporal Attitude.

	PA		NA		Affect Balance		PWB	
Variable	Estimate[a]	*SE*	Estimate[a]	*SE*	Estimate[a]	*SE*	Estimate[a]	*SE*
Fixed Effects								
Central variables								
Intercept (γ_{00})	3.38***	0.05	1.83***	0.05	1.55***	0.09	4.89***	0.07
Past attitude slope (γ_{10})	0.05***	0.01	-0.04***	0.01	0.09***	0.02	0.04**	0.01
Present attitude slope (γ_{20})	0.13***	0.01	-0.08***	0.01	0.21***	0.02	0.23***	0.02
Future attitude slope (γ_{30})	0.05***	0.01	-0.04***	0.01	0.09***	0.02	0.07***	0.02
Control variables								
Linear day slope (γ_{40})	-0.02**	0.01	<0.01	0.01	-0.02*	0.01	<0.01	0.01
Mean past attitude (γ_{01})	0.06†	0.03	-0.04	0.04	0.10†	0.06	>-0.01	0.04
Mean present attitude (γ_{02})	0.14**	0.05	-0.09*	0.04	0.25**	0.08	0.18**	0.07
Mean future attitude (γ_{03})	0.11*	0.04	-0.11†	0.05	0.21*	0.08	0.18**	0.06
Random effects								
Within-person (σ^2_r)	0.31***	0.02	0.23***	0.01	0.82***	0.04	0.60***	0.03
Between-person								
Intercept (σ^2_0)	0.15***	0.04	0.25***	0.04	0.54***	0.11	0.34***	0.07
Past attitude slope (σ^2_1)	<0.01†	<0.01	<0.01	<0.01	0.01*	0.01	<0.01	<0.01
Present attitude slope (σ^2_2)	0.01	<0.01	<0.01	<0.01	0.01	0.01	0.03***	0.01
Future attitude slope (σ^2_3)	<0.01	<0.01	0.01*	<0.01	0.01	0.01	<0.01	<0.01
Linear day slope (σ^2_4)	<0.01	<0.01	<0.01*	<0.01	<0.01	<0.01	<0.01*	<0.01

Note. Results are based on 1329 daily assessments (N = 119). PA = positive affect; NA = negative affect; Affect Balance = PA – NA; PWB = psychological well-being.

a. Unstandardized coefficients.

$^{\dagger}p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Temporal distance and well-being. The final series of MLM analyses examined the daily relationship between temporal distance and well-being. Once again, the same four well-being variables (*PA, NA, Affect Balance*, and *PWB*) each served as the dependent variable for the multilevel models. The following equation represents the within-person coupling model of temporal distance and well-being:

$$WB_{ij} = \beta_{0i} + \beta_{1i}(\text{past distance}_{ij}) + \beta_{2i}(\text{future distance}_{ij}) + \beta_{3i}(\text{day}_{ij}) + r_{ij} \quad (4a)$$

As before, the daily temporal distance variables were group-mean centered on each person's mean to control for individual differences in mean level. Day was included to control for any linear trends due to time, and was centered on the first day of testing. β_{0i} refers to the intercept, which is interpreted as the predicted well-being score on the first day of assessment for an average occasion of past and future distance for person *i*; β_{1i} and β_{2i} represent the slope coefficients for daily past and future distance; β_{3i} represents the linear time-related slope; past distance$_{ij}$ and future distance$_{ij}$ represent the scores on the respective measures for person *i* on occasion *j*; and r_{ij} represents the within-person residual variance in daily well-being.

Intercepts and slopes at the between-person level were modeled as random coefficients to allow for individual differences in initial levels and within-person relationships between temporal distance and well-being. Mean levels of past and future distance were entered as covariates to the random intercept in order to remove any of the between-person effects. The following equations represent the between-person model for temporal distance:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{mean past distance}_i) + \gamma_{02}(\text{mean future distance}_i) + u_{0i} \quad (4b)$$

$$\beta_{1i} = \gamma_{10} + u_{1i} \quad (4c)$$

$$\beta_{2i} = \gamma_{20} + u_{2i} \quad (4d)$$

$$\beta_{3i} = \gamma_{30} + u_{3i} \quad (4e)$$

Mean past and future distance was grand-mean centered. γ_{00} represents the average intercept; γ_{10} and γ_{20} represent the average within-person relationship between past and future distance and well-being, respectively; γ_{30} represents the average linear time-related trend in well-being; γ_{01} and γ_{02} represent between-person associations between average daily well-being and average past and future distance; and u_{0i}, u_{1i}, u_{2i}, and u_{3i} represent individual variations from average intercepts and slopes.

The results of the final within-person coupling models between daily well-being and daily temporal distance are presented in Table 4. Daily past distance reliably predicted fluctuations in daily PA, affect balance, and PWB (ps < .05). That is, on days when thoughts about the past were more distant (i.e., farther into the past) PA, affect balance, and PWB were all reliably higher (pseudo R^2 = 2.3%, 0.5%, and 2.7%, respectively). There was no such association between past distance and NA. Unlike past distance, future distance did not reliably predict any of the well-being outcomes.

Discussion

The primary aim of the current study was to take an important step toward a more complete understanding of temporal perspective and its day-to-day relationship with well-being. The introduction of an intensive repeated measures design (i.e., daily diary) to the temporal perspective literature allowed for an investigation of the potential for a balanced temporal perspective by examining whether people fluctuate in their temporal perspective, and if these fluctuations systematically covary with daily well-being. The results from multilevel analyses support the following conclusions: (a) there is evidence of within-person variability in daily temporal perspective, and (b) this within-person variability in temporal perspective fluctuates systematically with fluctuations in daily well-being. Each of these conclusions and their

Table 4

Multilevel Modeling Analyses of the Within-Person Relationship between Daily Well-Being and Daily Temporal Distance.

	PA		NA		Affect Balance		PWB	
Variable	Estimate[a]	*SE*	Estimate[a]	*SE*	Estimate[a]	*SE*	Estimate[a]	*SE*
Fixed Effects								
Central variables								
Intercept (γ_{00})	3.38***	0.06	1.84***	0.06	1.55***	0.10	4.90***	0.08
Past distance slope (γ_{10})	0.03*	0.01	-0.01	0.01	0.04*	0.02	0.06**	0.02
Future distance slope (γ_{20})	0.01	0.02	<0.01	0.02	0.01	0.03	0.02	0.02
Control variables								
Linear day slope (γ_{40})	-0.02**	0.01	<0.01	0.01	-0.02†	0.01	>-0.01	0.01
Mean past distance (γ_{01})	0.05	0.06	-0.03	0.06	0.09	0.10	<0.01	0.07
Mean future distance (γ_{02})	0.05	0.06	0.07	0.07	-0.02	0.12	0.02	0.10
Random effects								
Within-person (σ^2_r)	0.41***	0.02	0.29***	0.01	1.10***	0.05	0.80***	0.04
Between-person								
Intercept (σ^2_0)	0.25***	0.05	0.31***	0.05	0.88***	0.17	0.52***	0.11
Past distance slope (σ^2_1)	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01
Future distance slope (σ^2_2)	<0.01	<0.01	0.01†	<0.01	0.03*	0.01	0.01	0.01
Linear day slope (σ^2_3)	<0.01*	<0.01	<0.01*	<0.01	<0.01*	<0.01	<0.01*	<0.01

Note. Results are based on 1329 daily assessments (N = 119). PA = positive affect; NA = negative affect; Affect Balance = PA – NA; PWB = psychological well-being.

a. Unstandardized coefficients.

$^{\dagger}p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

implications will be discussed next.

Within-Person Fluctuations in Temporal Perspective and Well-Being

To date temporal perspective has been considered to be a stable individual difference variable (Zimbardo & Boyd, 1999). However, there has not been a research design equipped to appropriately test if people demonstrate within-person variation in the dimensions of temporal perspective. Shipp and colleagues (2009) proposed that temporal focus might shift from one temporal region to another in an ongoing manner. Similarly, Boniwell and Zimbardo (2004) proposed that people have the capacity to be flexible in their temporal orientations, despite the tendency for these orientations to be stable over time.

The present study employed an intensive repeated measures design to examine if individuals vary in their day-to-day experience of temporal focus, attitude, and distance. Not only was there a significant amount of within-person variability in each of the temporal perspective measures, individuals varied considerably more from themselves than they did from others. That is, their daily levels of each temporal perspective measure fluctuated more from their own personal mean levels than did their mean level fluctuate from the overall mean. Thus, the manner in which one focuses on the past, present, and future varies more day to day within a person than it does from person to person.

This finding does not negate that people may have stable, dominant temporal orientations; it does however shed light that individuals do fluctuate in their levels for all dimensions of temporal perspective (focus, attitude, and distance), as well as across each temporal region (past, present, and future). These daily fluctuations in temporal perspective dimensions point to the possibility of a balanced temporal perspective by demonstrating that

individuals have the potential to adapt and be flexible along each temporal perspective dimension, though they may not always be fluctuating in a manner that is beneficial or ideal.

Individuals also demonstrated more within-person than between-person variability in daily well-being. This was the case for each of the daily well-being measures (both affect and PWB). Other research using daily diary measures have found similar proportions of within- to between-person variability in PA and NA (e.g. Röcke, Li, & Smith, 2009). People consistently show more deviations from themselves in measures of well-being than they do from each other. Thus, the use of an intensive repeated measure design seems necessary to be able to account for these deviations, the daily ups and downs of life, that otherwise would not be captured nor understood with cross-sectional research designs.

Within-Person Relationships between Daily Temporal Perspective and Well-Being

Research on the relationships between temporal perspective and well-being has only considered global measures of each attained through cross-sectional research and examined with zero-order correlations (Boniwell et al., 2010; Kazakina, 1999; Litvinovic, 1998; Shipp et al., 2009; Zimbardo & Boyd, 1999). When considering the relationships between the aggregate levels of each temporal perspective variable and well-being, the present study found similar results as previous research (see Table 1). However, the strength of the current study was the ability to account for the daily fluctuations in well-being with multiple dimensions of daily temporal perspective. The contribution of each dimension in predicting daily well-being will be discussed separately.

Temporal focus and well-being. The temporal region that one focuses on plays a role in predicting daily well-being. Consistent with hypotheses, being focused on the present moment uniquely predicted daily well-being. On days when individuals were more focused on the

present, they also experienced higher positive affect, less negative affect, and a more positive balance of positive affect relative to negative affect. These results are to be expected, based on research and other teachings suggesting the importance of attending to the moment (Boyd-Wilson, Walkey, & McClure, 2002; Brown & Ryan, 2003; Csikszentmihalyi, 1990). Such a finding is also consistent with research warning of the dangers of a present focus, as the negative aspects of present focus are often associated with maximizing pleasure and avoiding negative feelings, which is demonstrated in its relation with risk-taking and thrill-seeking behaviours (e.g., sexual promiscuity, risky driving; Zimbardo et al., 1997; Rothspan & Read, 1996). However, the current results also found a significant association between present focus and PWB, indicating that a present focus is more than simply a reckless, live for the moment, approach to life. That people experience more PWB on days when they are more present oriented indicates that on those days they are functioning more optimally, through a variety of avenues (e.g., connections, autonomous and competent actions, vitality, personal expressiveness, etc.).

It is important to note that the significant relationship between present focus and well-being represents the average within-person relationship (i.e., the fixed effect). A closer inspection of the random effects indicates that there is significant interindividual variability in the within-person relationship between present focus and each of the well-being measures (see Table 2). Thus, not all individuals are demonstrating the same positive relationship between present focus and well-being. The inclusion of person-level moderators may provide insight as to how these relationships differ. Identification of individuals ‘living for the moment’ through reckless, carefree behaviours may account for the variation in the present focus–well-being relationship.

Focusing on the past was not as important in predicting daily well-being as focusing on the present. However, a daily past focus was related to both negative affect and affect balance. On days when people were more focused on the past, they experienced greater negative affect and a lower affect balance. No such relationship was found with PA and PWB. Thus, devoting more attention to thoughts of the past co-occurs with increased negative affect, but not positive emotions or experiences. It is unclear from these results whether focusing on the past brings about negative affect, or if experiencing negative affect leads one to reflect on the past. Global measures of past focus have found similar relationships with negative affect (Shipp et al., 2009). Research on rumination also corroborates the current findings that a frequent focus on the past is detrimental and can stir up negative feelings (Nolen-Hoeksema et al., 2003). Once again there was a significant level of interindividual variability in within-person relationships between past focus and both PA and PWB (see Table 2), which point to the potential for person-level moderators to explain the individual differences in these within-person relationships.

Finally, a daily focus on the future was not reliably associated with any of the daily well-being measures. Despite the null findings, these results are not uninteresting. Research has continuously demonstrated the benefits of a future focus, whether it is higher academic achievement, financial success, or health-conscious behaviour (Boyd & Zimbardo, 2005). Beyond research, our society is saturated with the message to constantly focus on the future. Children are encouraged to plan ahead in order to realize their potential at some later point. However, the importance of ongoing day-to-day well-being is neglected. When considering day-to-day well-being the current results show that focusing on the future is not important in predicting the daily ups and downs of life. Boniwell and colleagues (2010) even found that focusing solely on the future and neglecting the present can be detrimental to well-being. Though

the current results did not show this pattern for daily within-person relationships, when aggregated across the 14-day period future focus was associated with increased negative affect ($r = .24$, $p < .01$).

It was expected that future focus would not relate with daily affect, as focusing on the future likely involves ignoring the current moment and a willingness to sacrifice the enjoyment of today for the benefits of tomorrow. However, the lack of a relationship between future focus and PWB may be somewhat surprising, given the benefits of a future focus, such as the consideration of consequences and impulse control (Strathman et al., 1994). A potential explanation for the non-significant relationship between future focus and PWB is that despite the benefits of a future focus, an attention to the present moment may still be necessary to fully enjoy each day. Sheldon and Vansteenkiste (2005) proposed that a combination of present and future focus would likely be ideal for optimal functioning. Thus, the ability to switch from a future focus, where one considers the consequences of their actions, to a present focus, where one engages in the experiences of the moment may be what is important. Such an examination is beyond the scope of this paper, however such an investigation is possible with the introduction of the current daily diary design to this field of research.

Temporal attitude and well-being. The daily relationships between temporal attitude and well-being were consistent with hypotheses. On days when thoughts of the past were more positive, daily well-being was higher. Similar relationships were found with present and future attitude. When individuals considered what they were focused on in the moment to be positive, they also experienced greater well-being on those days. Finally, on days when thoughts about the future were more positive, daily well-being was also higher. This pattern of results was

consistent for all measures of well-being. Thus, positive attitudes toward each temporal region were significant in predicting daily well-being.

The current results are consistent with research examining related constructs. For instance, research on nostalgia and positive reminiscence demonstrates the positive influence of reflecting back on the positive times of the past (Bryant et al., 2005; Wildschut et al., 2006). In contrast, focusing on negative memories of the past has consistently related to lowered well-being in cross-sectional studies (Boniwell et al., 2010; Zimbardo & Boyd, 1999). Regarding present attitude, research on savouring provides support that deeply focusing on the positive aspects of the moment can be very rewarding and fulfilling (Bryant & Veroff, 2007). Research on hope and optimism corroborate the current findings that positive thoughts about the future relate positively to well-being (Scheier & Carver, 2003). Whereas, research on future anxiety has demonstrated that negative thoughts about the future can be detrimental (Zaleski, 1996). The current results add to the existing literature by demonstrating that daily fluctuations in well-being coincide with daily fluctuations in attitudes toward each of the past, present, and future. Thus, the manner in which you focus on each of the past, present, and future (positively *versus* negatively) plays an important role in understanding daily well-being. Once again, it is important to note that having positive thoughts of the past, present, and future does not cause daily well-being to increase anymore than increases in well-being causes positive thoughts. The causal direction cannot be established based on the current results, only that the variables travel together across time.

Temporal distance and well-being. The final dimension, temporal distance, also showed predictive ability in accounting for fluctuations in daily well-being. On days when past thoughts were more distant (i.e., more about the distant past than the near past), people experienced more

positive affect, affect balance, and psychological well-being. Though some research exists to support such a finding, the mechanisms underlying this relationship are yet to be sufficiently understood. That individuals experienced higher levels of positive affect and PWB, but not reduced NA, would indicate that a focus on the distant past is eliciting some form of positive experience in the individual. Studies have found that as past memories are more removed from the present moment, the negative aspects of these memories have less of an impact on our current experiences and moods (Strack et al., 1985). Other research has demonstrated the benefits of reflecting and savouring the good times of the past (Bryant et al, 2005). Thus, it may be that the negative and positive memories of the distant past operate differently in our ongoing daily experiences. Distant negative thoughts may be mollified by how far removed the individual is from these thoughts, whereas distant positive thoughts may be elevating the moods and experiences. Coming at the finding from the opposite side, where a focus on the near past reduces positive affect and PWB may provide more insight into the nature of the relationship. When an individual moves away from thoughts of the near past, their daily experiences improve. Thus, rumination about the recent past may be what is driving the negative relationship between proximal past thoughts and daily well-being. At present the underlying mechanisms of this relationship are largely speculative. An examination of interactions with temporal attitudes may shed light on the processes involved, however, such an investigation is beyond the scope of the current paper.

Unlike past distance, a focus on the distant future was hypothesized to be detrimental to the quality of daily experiences. However, such a finding was not supported with the current results. Instead, future distance did not predict any of the daily well-being outcomes. The hypothesis was predominantly based on the theory of temporal scarcity, such that as individuals

feel that their time is abundant, they are more likely to consider the distant future and less likely to maximize their current experiences. Conversely, as time is believed to be more scarce individuals are less likely to consider the distant future and instead attempt to maximize their current experiences (Carstensen et al., 1999). That we did not find such a relationship could be that a focus on the distant future relative to the near future does not have an impact on daily well-being. However, if one focuses on the distant future and negates the present then such a detrimental relationship may be found.

In sum, each temporal perspective dimension demonstrated usefulness in predicting daily well-being. As hypothesized, a present focus was key to the overall experience of daily well-being, both in the form of affect and psychological well-being. Conversely, a past focus was associated with increased negative affect and poorer affect balance, whereas future focus did not predict any of the daily well-being outcomes. Positive attitudes toward each temporal region were also important in predicting all daily well-being outcomes. Finally, as thoughts about the past became more distant, the positive indicators of well-being were increased. Such a finding was not observed with future distance.

Limitations

Despite the strengths of the current study that advance temporal perspective research, there are a number of limitations that still need to be addressed in future research. The most glaring limitation involves use of a student sample. Though the relationships between temporal perspective and well-being are believed to occur across different ages and populations, such a claim cannot be made based on the current sample. The student sample is likely to differ from more generalized community samples in potentially important ways, particularly on measures of temporal perspective. For instance, university students are likely to be more goal-orientated,

resulting in a greater future focus than the general population. Additionally, the current study took place during the first three weeks of the fall semester. There have been findings that students who participate in studies that take place early in the semester tend to be more future oriented than students who participate later in the semester (Harber et al., 2003). However, even with this future orientation, the current study still found flexibility in temporal perspectives as well as finding that a present focus contributes to the understanding of daily well-being. Thus, even if students are more future oriented, the relationships between daily temporal perspective and well-being should not have been affected.

Another potential limitation was the method used to record the daily diaries. An online diary was made available for participants to record their diary entries at their convenience. Though this tool has a number of advantages, such as controlling access time, convenient access, and a record of time completed, it also has some potential drawbacks. For instance, participants were required to be in contact with technology each evening in order to complete the diaries. Though this did not likely alter the daily experiences within this sample of university students, it is possible that the requirement to use technology introduced an element into their daily experiences that may not be there normally. However, the drawback of such a tool is countered by the important benefit of ensuring that the completion times are not mispecified. Other methods that do not require technology (i.e., paper booklets) also do not account for when the diaries are being completed and are susceptible to the "parking lot effect", where participants complete all of the entries immediately before submitting the booklets (Stone, Shiffman, Schwartz, Broderick, & Hufford, 2002).

Similar to the previous limitation, the sampling time frame could also be a potential limitation. There has been much research on daily measures of well-being, and this seems to be

an appropriate time frame to adequately capture the microlongitudinal changes (i.e., daily fluctuations) in well-being. However, it is unclear if daily measures of temporal perspective represent the ideal time frame to adequately capture fluctuations in this construct. Conceptually, each of the temporal perspective dimensions possesses the capacity to shift moment to moment within our continual flow of attention. In this way, fluctuations in temporal perspective may be occurring in an ongoing manner. Thus, daily assessments may not be sensitive enough to capture such fluctuations. More frequent assessments such as experience sampling methods (ESM; Hektner, Schmidt, & Csikszentmihalyi, 2007) could provide a more appropriate way to capture the ongoing process of temporal perspective. Nevertheless, the current study was able to find evidence for within-person fluctuations, indicating that daily assessments are still sensitive enough to capture shifts in temporal perspective.

The ability of the current design to identify daily fluctuations in temporal perspective and to use these fluctuations to predict daily well-being is a clear strength for the current study. However, as mentioned previously this design does not establish a causal direction from temporal perspective to well-being. Even though temporal perspective variables systematically covary with well-being variables, it is still unclear if temporal perspective causes well-being, or vice-versa.

Future Directions and Conclusions

In many ways the current research served as an initial step necessary to open the door on a number of research avenues that remain unexplored. The repeated measures design enabled an investigation of the intraindividual variability in temporal perspective dimensions. Now that such flexibility has been established, a more thorough examination into the make-up of a balanced temporal perspective is called for. It is clear that individuals fluctuate in their temporal

perspective, what remains to be understood is whether these shifts correspond to the situations at hand in an adaptive manner. Is a balanced temporal perspective best conceptualized as one where individuals flexibly engage in each situation with the appropriate temporal focus (Boniwell & Zimbardo, 2004), or one where individuals are consistently focusing on multiple temporal regions (e.g., present and future; Sheldon & Vansteenkiste, 2005). Such questions can be addressed through the extension of the current research and the use of intensive repeated measures designs, rather than continuing to rely on cross-sectional data (e.g., Boniwell et al., 2010). The current methods for capturing temporal perspective may also be improved with the use of experience sampling methods that randomly sample from moments within the day, virtually eliminating any recall bias that may occur.

Another avenue to explore are the potential person-level moderators that may be accounting for the differences seen in within-person relationships. The inconsistencies in the portrayal of a present focus (beneficial *versus* hazardous) that have existed in the literature may be better understood through the use of person-level predictors that may account for the variation in the within-person relationships between present focus and well-being. Inclusion of within-person interactions between temporal dimensions will also provide a better understanding of how each temporal dimension operates in predicting well-being and if different combinations provide a more ideal manner in attending to the different temporal regions. Finally, implementing a design that ultimately induces particular temporal perspectives will be a necessary step in determining the causal influence of temporal perspective on well-being.

The current study was successful in introducing a daily diary research design to investigate the constructs of temporal perspective. This was a necessary direction for this field to move in, especially as more emphasis is placed on identifying an ideal temporal perspective

believed to influence well-being. Reliance on single-occasion measurements fails to account for the ongoing experiences that make up one's life. Findings of the current study provide insight into the role temporal perspective plays in the quality of our day-to-day lives. The importance of attending to the present moment is often neglected in our fast-paced world that is always concerned with "what's next?" However a focus on the present moment and an interest in "what's now" should be highlighted more frequently.

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