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A balanced time perspective: Is it an exercise in empiricism, and does it relate meaningfully to health and well-being outcomes?

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Time perspective research assesses the degree to which thoughts and feelings about the past, present and future influence behaviour, and a balanced time perspective profile has been posited as being ideal. Although this area of research has seen a move towards person-centred analyses, using either cluster analyses or a deviation from balanced time perspective (DBTP) approach, there are a number of theoretical and methodological issues that must be addressed. Using data from diverse samples in four countries, the present study used both cluster analyses and the DBTP approach to assess how cluster membership and DBTP scores related to a range of health and well-being outcomes. As in previous studies, a balanced profile only emerged once in cluster analyses, and positive-oriented profiles were associated with optimal outcomes. The study also found evidence of a relationship between DBTP scores and scores on well-being indicators. However, results gained after manipulating the DBTP equation in two different ways again indicated that higher than expected positive past and present or past and future scores were responsible for the positive outcomes. As such, these findings raise concerns regarding the use of the DBTP construct within clinical settings.

Keywords: Balanced time perspective; Well-being; Deviation from a balanced time perspective (DBTP); Time perspective profiles.

Time perspective (TP) is an individual difference variable said to derive from the "process whereby the continual flows of personal and social experiences are decomposed or allocated into temporal categories" (Zimbardo & Boyd, 1999, p. 1271). It is a multi-dimensional construct that describes the way in which thoughts and feelings about the past, present and future influence behaviour. Researchers continue to debate the extent to which time perspective represents a process or a trait (e.g., see Stolarski, Vowinckel, Jankowski, & Zajenkowski, 2016).

The Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) has been central to the development of time perspective research. Purposively designed to assess the cognitive, affective and behavioural dimensions of time perspective, the ZTPI measures time perspective in five domains: past negative (PN), past positive (PP), present hedonistic (PH), present fatalistic (PF) and future (F; with an emphasis on planfulness). Although Zimbardo and Boyd (1999) argued that individuals can develop a bias towards any one of these domains, individuals relate to all domains simultaneously and to matters of degree (e.g., Shipp, Edwards, & Schurer-Lambert, 2009). Insofar as this is true, it follows that research examining the extent to which scores on the ZTPI are related to scores on criterion variables should simultaneously take account of scores on all scale dimensions. Indeed, Zimbardo and

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Boyd (1999) hypothesized that a so-called *balanced time perspective* (BTP)—that is, a profile consisting of relatively high scores on past positive, present hedonistic and future, and relatively low scores on present fatalistic and past negative—was optimal.

Adjustments to the conceptualization of a BTP (Zimbardo & Boyd, 2008) led to the definition solidifying as a profile consisting of high PP, moderate PH and F and low PN and PF scores. Efforts to further operationalise this theoretically defined BTP have been facilitated through the move towards person-centred analyses in the study of time perspective, which has recently gained momentum (e.g., Boniwell, Osin, Linley, & Ivanchenko, 2010; Cole, Andretta, & McKay, 2016; Sircova et al., 2015; Zhang, Howell, & Stolarski, 2013). Such studies have typically used cluster analyses (e.g., Boniwell et al., 2010; Cole et al., 2016) or the deviation from balanced time perspective (DBTP) approach (Stolarski, Bitner, & Zimbardo, 2011). It is important to note that the BTP profile and DBTP are not synonymous: the former is an empirically derived profile and the latter is a profile derived by formula that was developed to be correlated with adaptive outcomes. Despite this difference, studies investigating BTP and DBTP are affected by a number of related methodological and theoretical problems, which we explore and seek to address within the present study. In particular, careful examination and consideration of DBTP is crucial given that clinicians have begun to use it as a marker in treatment outcomes (e.g., Oyanadel, Buela-Casal, Araya, Olivares, & Vega, 2014).

A key challenge for social scientists working in relatively new research fields, like time perspective, is the requirement to demonstrate empirically that our theoretical, non-tangible constructs actually exist. Although sufficient evidence exists to support individual differences in the expression of the five temporal constructs measured by the ZTPI, the existence of the BTP is still questionable. A specific concern here is that the majority of studies using cluster analyses have failed to report the existence of a balanced profile. For example, Boniwell et al. (2010) were the first researchers to identify ZTPI profiles and they did not find Zimbardo and Boyd's (1999, 2008) balanced profile, nor Stolarski et al.'s (2011) interpretation of it, in either of their two samples; indeed, they created two different balanced profiles and labelled a third profile that satisfied "the BTP criteria" (p. 3) balanced. Thus, there is the distinct possibility that the BTP is not a common one.

If the BTP profile is not common and does not appear to exist in some samples, it is hard to argue that it is ideal (unless one also wishes to argue that much of the world is unbalanced). Thus, while it is arguably the case that the BTP profile can be used as a theoretical yardstick for optimum temporal functioning, its practical utility is lacking if researchers cannot consistently and empirically demonstrate that some proportion of the population does, in fact, have this profile. Furthermore, the ideal nature of the BTP profile, whether as a theoretical yardstick or verified construct, has also not been convincingly demonstrated through empirical research. Specifically, some researchers have found that the balanced profile is, in fact, *not* optimal, in that individuals with this profile do not report the most adaptive outcomes (e.g., McKay, Andretta, Magee, & Worrell, 2014).

The DBTP method was developed by Stolarski et al. (2011) to operationalise the BTP profile in a manner that was not sample specific, as is the case with cluster analysis. It entails the development of time perspective profiles based on the degree to which each participant reports non-balanced scores (see Supplementary Material for the complete equation). Thus, the DBTP coefficient is a measure of fit between the individual's time perspective profile and Zimbardo and Boyd's (2008) hypothetical optimal time perspective profile, such that "a DBTP value close to zero indicates an almost perfectly balanced time perspective (the theoretical ideal), where a positive value indicates a person's time perspective is out of balance (and, is expected to be maladaptive)" (Stolarski et al., 2011, p. 355). Within this calculation, it should be noted, it does not matter whether an individual's TP scores are higher or lower than the *ideal* values; it is just the magnitude of the differences that count. Further, given the DBTP formula, it is possible, and highly likely, that individuals with vastly different TP profiles can have identical DBTP scores.

A number of studies have found DBTP to be a significant predictor of a range of well-being related outcomes. For example, Zhang et al. (2013, p. 181) reported that "as an individual's time perspective profile deviates from the optimal BTP profile (as measured by the DBTP), they experience less satisfaction with life, happiness and positive affect as well as more negative affect." Additionally, it is also clear in past research that DBTP is not always as strong a predictor as individual ZTPI subscales for some psychosocial outcomes. For example, Stolarski (2016) found that DBTP was more weakly associated with life satisfaction than was PN, and also more weakly associated with extraversion than was PH. As such, there is also a need to determine if and when DBTP is a more useful metric than the five individual TP subscales for predicting or understanding psychosocial, health and well-being-related outcomes in relation to which DBTP is often investigated. It is also possible that, given the differing patterns of association between the five TPs and outcome variables, the ideal formulation of DBTP might include a weighting of the TP scores. Deviation on PN, for example, may be more important than deviation on PH.

Perhaps more critical, however, is the need to address an underlying problem relating to the data used to inform the values used in Stolarski et al. (2011)'s DBTP formula.

The origin of these values is explained by the authors as follows:

> Following Zimbardo and Boyd's proposal (cf. www .thetimeparadox.com/surveys), and based on Zimbardo and Boyd's collective crosscultural database, we defined a 'high' score on past positive as 4.60, a 'moderately high' score on present hedonism and future as 3.90 and 4.00 respectively, and 'low' on past negative and present fatalism as 1.95 and 1.50 respectively." (Stolarski et al., 2011, p. 354)

No further information is provided by the authors regarding this collective cross-cultural database: not the number of participants, nor any other contextualising demographic information. As such, the representativeness of the sample and, therefore, the generalisability of findings associated with it, are unknown.

Further to this, subsequent to the publication of Stolarski et al.'s article, the sample distribution on which the DBTP values were based has been updated. Hence, the most recent values available from Zimbardo and Boyd's database (as published on www.thetimeparadox.com/surveys on 17 September 2012) are as follows: PP = 3.67; PH = 4.33; F = 3.69; PN = 2.10 and PF = 1.67. Regardless of the magnitude of some of the changes in these values, the DBTP equation has not been updated, nor has additional information relating to the study sample on which it is based been published. Of central import here, the updated sample distribution indicates that less than 1% of participants achieved a PP score of 4.11 or higher, thus making the rarity of meeting BTP criteria abundantly clear.

Taken together, the lack of clear empirical evidence supporting the existence of the BTP profile and the validity and utility of DBTP should lead to concern in relation to the use of the DBTP in clinical decision-making, which puts this construct into the high-stakes decision-making realm. In particular, the current state of affairs suggests the need for at least three additional, important considerations: (a) that ZTPI scores on which the DBTP is based are held to the highest psychometric standards (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education [AERA, APA, & NCME], 2014), (b) that there is *strong* evidence that the DBTP is indeed the (or an) *optimal* profile for specific clinical outcomes and (c) that it is possible for people to change their TP profile, whether through therapy or other means.

With regard to the first consideration, there are more psychometric studies in the literature raising concerns about ZTPI scores than there are providing strong support for the scores, a fact that has resulted in the creation of at least seven versions of the ZTPI, with numbers of items ranging from 56 (the original scale) to 15. Moreover, although it can be argued that the DBTP formula results in scores that are comparable across samples, this comparability is only useful if TP scores show strong invariance across samples, which is not the case. To address the second consideration requires comparing the DBTP profile to other empirically derived and created profiles and showing the DBTP to be superior in relation to a range of well-being-related variables, research that has not yet been done. Similarly, addressing the third consideration requires a substantial body of longitudinal and intervention studies, which do not currently exist. So it is not clear that clinicians using the DBTP are not only *doing good* but also *doing no harm*.

In a rapidly developing literature, the present study used data from four countries to examine three salient issues: (a) would a BTP profile emerge in cluster analyses in all samples, (b) would a DBTP score be significantly and meaningfully associated with both alcohol-use behaviours and psychological measures of well-being and (c) would any profiles found in the cluster analyses be associated with more adaptive outcomes? Based on the extant literature, we hypothesized that a BTP profile would not emerge in cluster analyses, and secondly, that the DBTP would be meaningfully and negatively related to indicators of well-being. We also hypothesized that positive-oriented profiles identified by cluster analyses would be associated with more adaptive outcomes than other profile types.

METHOD

Participants

Participants in this study were drawn from five samples of convenience in four countries where ZTPI scores were being used in research studies, and included both adolescents and adults. Participants in the Australian sample were recruited from a university in Victoria ($N = 127$; Male = 36 [28.49%], $M_{age} = 37.40$ [$SD = 12.39$]). Participants in the first British sample were from a university in the North West of England ($N = 940$; Male = 452 [48.1%]; $M_{age} = 22.44$ [$SD = 7.36$]). Participants in the second British sample were adolescents recruited from eight high schools in Northern Ireland ($N = 735$; Male = 336 [49.8%]; $M_{age} = 14.2$ [$SD = 2.11$]). Participants in the Slovenian sample were university students ($N = 314$; Male = 88 [28%]; $M_{age} = 20.81$ [$SD = 3.70$]). Participants in the American sample were university students ($N = 499$; Male = 118 [23.6%]; $M_{age} = 22.77$ [$SD = 6.13$]). For the British, Northern Ireland and Slovenian samples, data were collected using a paper-and-pencil format, and compensation was not offered for participation. In the Slovenian sample, data were collected through on-line questionnaire, participants were not offered any compensation. In the American and Australian samples, data were collected through an

on-line platform and university student participants were eligible for extra-credit towards their courses for participating.

Measures

The original ZTPI (Zimbardo & Boyd, 1999) has 56 items, which are responded to on a 5-point scale (1 = *very untrue of me*, 5 = *very true of me*). Five subscales can be calculated: past positive (PP; 9 items; e.g., "Familiar childhood sights, sounds, smells often bring back a flood of wonderful memories;" $\alpha = .78$), past negative (PN; 10 items; e.g., "I often think of what I should have done differently in my life;" $\alpha = .84$), present hedonism (PH; 15 items; e.g., "I believe that getting together with one's friends to party is one of life's important pleasures;" $\alpha = .79$), present fatalism (PF; 9 items; e.g., "Fate determines much in my life;" $\alpha = .70$) and F (13 items; e.g., "I believe that a person's day should be planned ahead each morning;" $\alpha = .76$). Higher scores indicate a greater endorsement of that particular time perspective. The alpha coefficients in the present study were all in the acceptable range in each sample: Australia ($.73 < \alpha < .89$); British sample 1 ($.70 < \alpha < .81$); British sample 2 ($.73 < \alpha < .79$); America ($.73 < \alpha < .82$) and Slovenia ($.72 < \alpha < .81$).

The alcohol use disorders identification test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) consists of 10 items. Eight of the items are responded to on a 5-point scale (e.g., "How often do you have six or more drinks on one occasion?") and two on a 3-point scale (e.g., "Have you or someone else been injured as a result of your drinking?"). Total scores range from 0 to 40, with higher scores indicating more disordered alcohol use. AUDIT scores have been found to have good reliability and validity (Babor et al., 2001). For the current samples, Cronbach's alphas were as follows: Australian sample, $\alpha = .84$ and British sample 1, $\alpha = .83$.

The Rosenberg Self-Esteem Scale (RSES, Rosenberg, 1965) has 10 items, which are responded to on a 4-point scale (*strongly disagree* = 0 to *strongly agree* = 3). Half of the items are positively worded (e.g., "On the whole, I am satisfied with myself") and half negatively worded (e.g., "All in all, I am inclined to feel that I am a failure"). The latter items are reverse scored, such that total scores range from 0 to 30, with higher scores indicating higher levels of self-esteem. RSES scores have been found to have good reliability and validity (Rosenberg, 1965). For the current samples, Cronbach's alphas were as follows: Australian sample, $\alpha = .92$; British sample 2, $\alpha = .88$ and American sample, $\alpha = .89$.

The revised version of the life orientation test (LOT-R; Scheier, Carver, & Bridges, 1994) is a 10-item measure assessing optimism. Items are responded to on a 5-point scale (*strongly disagree* = 0 to *strongly agree* = 4), with three items being reverse scored and four filler items. Example items include "In uncertain times, I usually expect the best" and "If something can go wrong for me, it will." Total scores range from 0 to 24, with higher scores indicating higher levels of optimism. LOT-R scores have been found to have good reliability and validity (Scheier et al., 1994). For the current Australian sample, Cronbach's $\alpha = .77$. The American data included a prior version of the LOT (Scheier & Carver, 1985). This version includes 12 items, with 4 fillers and 4 recoded items. Summed scores range from 0 to 32 (Cronbach's $\alpha = .82$).

The 21-item version of the Depression, Anxiety and Stress Scales (DASS-21; Henry & Crawford, 2005) assesses levels of symptomology associated with depression (e.g., "I couldn't seem to experience any positive feeling at all"), anxiety (e.g., "I felt I was close to panic") and stress (e.g., "I felt that I was using a lot of nervous energy"). All items are responded to on a 4-point scale (0 = *Did not apply to me at all*, 3 = *Applied to me very much, or most of the time*). So that scoring is comparable with the original 42-item DASS (Lovibond & Lovibond, 1995), subscale scores are calculated by summing relevant items and multiplying by two. Thus, each seven-item subscale has a scoring range of 0–42, where higher scores indicate a higher level of symptomology. DASS-21 scores have been found to have good reliability and validity (Henry & Crawford, 2005). For the current study, only the depression and anxiety subscales were used with the Australian sample. Cronbach's alphas for the subscales were as follows: depression, $\alpha = .93$; anxiety, $\alpha = .89$.

The Multidimensional Health Locus of Control (MHLC) Scale (Wallston, Strudler Wallston, & DeVellis, 1978) examines motivation for health-related behaviours. It consists of three subscales, internal health locus of control (MHLC-I; e.g., *I am in control of my health*; α in present study = .78), powerful others health locus of control (MHLC-PO; e.g., *Health professionals control my health;* α present study = .73*)* and chance health locus of control scale (MHLC-C; e.g., *Most things that affect my health happen to me by accident*; α present study = .74). The questionnaire is available in three forms (A, B and C). Forms A and B are the general health locus of control scales, and Form C is for people with an existing medical condition. In the present study, Form A was administered to the Slovenian sample. Participants were asked to self-rate both their physical and mental health on a scale of 1–5, where 1 = *poor* and 5 = *very good*.

Statistical analyses

Details of analyses are contained in Section (i), Supplementary Material. To aid the interpretation of the analyses, we applied the criteria of Ferguson (2009). Accordingly, a recommended minimum effect size for β (or a

practically significant effect size) is ≥ .2, a moderate effect size ≥ .5 and a strong effect ≥. 8. Effect size differences for means were computed using Hedges' *g*, a variant of Cohen's *d* which accounts for sample size biases. Again, we employed Ferguson's (2009) guidelines to aid interpretation where a *g* value ≥.41 was interpreted as the recommended minimum practical effect size, and *g* values ≥1.15 were interpreted as moderate.

RESULTS

Cluster analyses

The results of Ward's cluster analyses for each of the five samples are detailed in Section (ii), Supplementary Material. Chi-square analyses revealed no significant gender differences across profiles: Australian sample ($\chi^2 = 7.45$, df_2, $p = .06$); British sample 1 ($\chi^2 = 1.70$, df_2, $p = .43$); British sample 2 ($\chi^2 = .67$, df_1, Fishers exact test = .24); American sample ($\chi^2 = 0.849$, df_2, $p = .83$) and Slovenian sample ($\chi^2 = 3.80$, df_2, $p = .15$). The balanced profile (or a profile broadly resembling that described as balanced) emerged in only one of the five samples, the Australian sample.

Differences among clusters

In this section, interpretations are based on effect sizes in the moderate or higher range, as indicated by Hedges' *g*. The tables are contained in Section (iii), Supplementary Material and contain means and standard deviations for the variables by cluster as well as the differences among clusters. Table S2 displays the results for contrasts in the Australian sample. As the mean scores indicate, past positives had the lowest scores on problematic alcohol use, depression and anxiety, and the highest scores on optimism and self-esteem. Moreover, past positives differed meaningfully on depression, anxiety, optimism and self-esteem from the past negative-fatalists and balanced groups, and on depression, anxiety, optimism and problematic alcohol use from the ambivalent group. The balanced group did not differ from the past negative-fatalists on any of the five outcome variables, and reported meaningfully higher depression scores and meaningfully lower self-esteem and optimism scores than the ambivalents.

Table S3 (Supplementary Material) displays the results of cluster differences for the first British sample. In Sample 1, the past positives-fatalists had the best outcomes, but did not differ meaningfully from the other two clusters on any outcome (Ferguson, 2009). In the second UK sample, ambivalents ($N = 601$; $M_{\text{Self-esteem}} = 29.35$ [4.29]) reported significantly lower self-esteem scores than the negative-presents ($N = 134$; $M_{Self\text{-}esteem} = 32.24$ [3.68]) with a meaningful effect size (Hedges' $g = .69$). Table S4 (Supplementary Material) contains the results for the American sample. Ambivalents reported significantly higher self-esteem and optimism scores than present-fatalists, but only the difference for self-esteem was meaningful.

Table S5 (Supplementary Material) shows the results of the contrasts among ZTPI profiles on criterion variables in Slovenia. In this national context, findings were mixed. There were no differences among clusters for self-rated physical health, but ambivalents reported meaningfully higher self-rated mental health and lower scores on the role of chance on health outcomes than did past-negative-present-oriented individuals. Ambivalents also reported meaningfully higher internal locus of control for health and meaningfully lower scores on the role of powerful individuals than did past negatives. Finally, past negative-present-oriented individuals reported meaningfully higher scores on both internal locus of control and the role of chance than did past negatives.

Association of the DBTP profile score with outcome variables

Table 1 displays the results for the DBTP regressions in the five samples, after controlling for age and gender. Results show that DBTP was significantly associated with all criterion variables in the Australian sample, with effect sizes ranging from minimally practically significant to moderate practical significance. The betas for the DBTP regressions in the two British samples were in the minimal practical significance range for anxiety, depression and self-esteem, but not for AUDIT scores. Results show that, adjusted for age and gender, DBTP was significantly associated with both HADS-A and HADS-D score in UK Sample 1 and self-esteem in UK Sample 2, although the effect sizes were small. Results also show that DBTP was not significantly associated with AUDIT score. In the American sample, the DBTP profile was significantly associated with self-esteem and optimism with moderate effect sizes. Finally, Table 1 shows that DBTP was significantly associated with self-rated physical health, self-rated mental health, MHLC-Internal and MHLC-chance scores in Slovenia, all with small but interpretable effect sizes.

Given the co-existing realities that a balanced profile rarely emerges in cluster analyses, and the DBTP equation produces scores that relate meaningfully to well-being outcomes, we conducted some *post-hoc* exploratory analyses using the Australian sample to see which of the three positive aspects of the DBTP score are driving the associations with well-being. For these analyses we manipulated the equation in two ways. Firstly, rather than having the expected PH (e*PH*) scored as 3.90, we scored it as 2 so that the BTP would essentially represent high scores on PP and F only. Secondly, we manipulated the equation so that the e*F* would be scored as 2, rather than the proposed

TABLE 1
Association between deviation from balanced time perspective and scores on a range of measures (adjusted for age and gender)

Australia (n = *127)*	*B*	*SE B*	*B*	*95% C.I. B*	*p value*
AUDIT	2.107	.717	.254[a]	.687, 3.527	.004
Self-esteem	−3.406	.573	−.468[a]	−4.541, −2.271	<.001
Optimism	−2.148	.264	−.587[b]	−.2670, −1.626	<.001
Depression	7.217	.871	.625[b]	5.490, 8.943	<.001
Anxiety	5.083	.929	.457[a]	3.242, 6.923	<.001
UK sample 1 (*N* = 940)					
AUDIT	.220	.297	.024	−.364, .803	.460
HADS-A	1.235	.192	.211[a]	.858, 1.611	<.001
HADS-D	.963	.143	.218[a]	.682, 1.244	<.001
UK sample 2 (*N* = 735)					
Self-esteem	−2.262	.197	−.373[a]	−2.648, −1.876	<.001
America (*N* = 499)					
Self-esteem	−.599	.036	−.596[b]	−.670, −.527	<.001
Optimism	−.556	.041	−.520[b]	−.637, −.476	<.001
Slovenia (*N* = 314)					
Physical health	−.290	.066	−.214[a]	−.419, −.162	<.001
Mental health	−.502	.060	−.373[a]	−.623, −.380	<.001
MHLC-Internal	−.290	.058	−.240[a]	−.405, −.175	<.001
MHLC-Chance	.317	.055	.274[a]	.208, .425	<.001
MHLC-Powerful others	.202	.057	.172	.090, .314	<.001

Note: AUDIT = alcohol use disorders identification test; HADS = Hospital Anxiety and Depression Scale (A—Anxiety; D—Depression); MHLC = Multidimensional Health Locus of Control Scale.
[a]Interpretable effect size. [b]Moderate effect.

4; in this second manipulation, a BTP would represent high scores on the PP and PH subscales. The results of regressions based on these scoring approaches are displayed in Table S6 (Supplementary Material).

Results demonstrate that in the second manipulation (where the expected F was scored as 2 rather than 4), results are remarkably similar to those reported using the original formula, with effect sizes (betas) all in the interpretable range (Ferguson, 2009). This result highlights the importance of a positive past and hedonistic present. The results of the second manipulation, which privileged a positive past and planful future, yielded one result in the interpretable range, that is, with optimism, a variable that is both present and future oriented. This latter score was not related to the other four outcomes, which are all present-oriented.

In order to further interrogate the robustness of the DBTP in statistically predicting well-being scores, we re-ran the analyses reported in Table 1, except this time adjusting for DBTP scores at step 2. Results (see Table 2) demonstrate that many of the significant results in Table 1 became non-significant with the inclusion of the ZTPI subscale scores. This finding suggests that the DBTP is a better predictor of outcomes than the clusters. However, in addition to those analyses, we also examined the predictive power of DBTP score above and beyond raw ZTPI dimension scores (Table S7 Supplementary Material). Here, it is observed that the majority of previously significant findings (using DBTP only) became non-significant with the introduction of ZTPI dimension scores.

Having recognised significant limitations in the operationalization of DBTP scores, we sought to examine the psychometric viability of an overall time perspective score based on the ZTPI scales by conducting a higher-order confirmatory factor analysis in the combined sample. These results are detailed in Section (iv), Supplementary Material. In short, there was no evidence for a higher order model nor a single-factor model.

DISCUSSION

The present study sought to interrogate the relationship between two person-centred applications of ZTPI scores—that is, profiles derived from cluster analyses and DBTP scores—and scores on a number of well-being indicators. A profile similar to the balanced profile emerged in only one of five samples, and this profile did not report the most adaptive outcomes. Controlling for age and gender, DBTP scores had meaningful associations with well-being in the adaptive direction and DBTP associations with well-being were stronger than the associations between well-being and profiles derived from cluster analysis. However, a *different* DBTP formula yielded similar results with well-being as the currently recommended formula and the associations of DBTP scores with well-being decreased to the point of non-significance with small effect sizes after controlling for individual ZTPI scores.

TABLE 2
Analyses of covariance with ZTPI clusters entered at step 1 and DBTP scores at step 2

	Levene's test of homogeneity		*Clusters only at step 1 (top row) and step 2 (bottom row)*			*Results for DBTP at step 2*		
	F	*p value*	*F*	*p value*	η^2	*F*	*p value*	η^2
Australian sample								
AUDIT	3.182	.027	1.328	.269	.033			
	1.535	.209	4.930	.003	.113	21.743	<.001	.159
Self-esteem	.228	.876	6.653	<.001	.140			
	.406	.749	.122	.947	.003	15.758	<.001	.114
Optimism	1.924	.129	13.621	<.001	.249			
	.973	.408	1.165	.326	.028	25.95	<.001	.175
Depression	6.373	<.001	10.451	<.001	.227			
	2.195	.093	.187	.905	.005	30.745	<.001	.225
Anxiety	6.878	<.001	4.233	.007	.106			
	6.942	<.001	.360	.782	.010	15.941	<.001	.131
UK sample 1								
AUDIT	0.693	.501	16.45	<.001	.034			
	0.312	.732	20.41	<.001	.042	8.343	<.001	.013
HADS-A	4.390	.013	4.15	.016	.011			
	3.062	.047	1.12	.328	.002	31.223	<.001	.032
HADS-D	2.395	.092	2.53	.080	.005			
	0.525	.592	13.33	<.001	.028	79.931	<.001	.078
UK sample 2								
Self-esteem	3.159	.076	52.25	<.001	.067			
	4.583	.033	1.09	.297	.001	88.529	<.001	.108
American sample								
Self-esteem	5.091	.025	26.47	<.001	.052			
	.374	.541	1.668	.197	.003	246.158	<.001	.338
Optimism	5.255	.022	6.953	.009	.014			
	.065	.799	1.527	.217	.003	187.759	<.001	.279
Slovenian sample								
Physical	.126	.882	1.323	.268	.008			
	.166	.847	1.083	.340	.007	11.388	.001	.035
Mental	9.460	<.001	3.667	.027	.023			
	7.209	.001	.951	.387	.006	24.623	.001	.074
MHLC-I	.371	.690	12.960	<.001	.077			
	.217	.805	7.501	.001	.046	8.563	.004	.027
MHLC-C	2.694	.069	18.085	<.001	.104			
	2.417	.091	7.476	.001	.046	8.435	.004	.026
MHLC-PO	4.145	.017	6.401	.002	.040			
	4.088	.018	1.455	.235	.009	5.618	.018	.018

Note: AUDIT = alcohol use disorders identification test; HADS = Hospital Anxiety and Depression Scale (A—Anxiety; D—Depression); MHLC = Multidimensional Health Locus of Control Scale.

Context for clinical use of scores

Before discussing these results, it is important to underscore the nature of the evidence required for using psychological tests to make clinical decisions. In this circumstance, it is important to pay attention to available normative data, the psychometric properties of the test scores, including stability (i.e., test–retest reliability), "and the effects of moderator variables and demographic characteristics on test results" . . . . [as the clinician needs to rely upon] "the body of scientific knowledge available for the test that support appropriate inferences" (AERA, APA, & NCME, 2014, p. 154). In the study that introduced the DBTP (i.e., Stolarski et al., 2011), the sample consisted of a convenience sample of 126 university students in Warsaw, 100 of whom were female, and the ZTPI version consisted of 54 items. Thus, it is clear that the initial validation of the DBTP was based on a small student sample from one city in one country, using values derived from an undefined sample of data collected through Zimbardo and Boyd's website (www.thetimeparadox.com). Furthermore, as noted earlier, the values used in the DBTP calculation have not been demonstrated to reflect population norms and are not consistent with the most recent values from the same data source. Regardless of these serious issues, the DBTP is being put forward as the basis for a clinical intervention globally.

In this study, we also used samples of convenience, but four of our samples were considerably larger than Stolarski et al.'s (2011) original DBTP validation sample. Moreover, the current study is also strengthened by the fact that the samples used were diverse in age and national

origin. A mixture of adolescent, university and adult samples in four countries—America, Australia, United Kingdom and Slovenia, allowed the opportunity to examine the relationships in a variety of contexts. Studies of this type are critically important in establishing whether the claims about the DBTP are substantiated and universally applicable.

Generalizability and possible benefits of the DBTP profile

The first important observation is that, although hypothesized as optimal (Boniwell & Zimbardo, 2004; Boniwell et al., 2010; Zimbardo & Boyd, 1999), the balanced profile only emerged in one of the five samples when hierarchical cluster analyses were used, and similar findings have been reported in other studies as well. This begs the question, does a generalizable balanced profile really exist if it fails to replicate across studies? If it is, in fact, a profile that will never or rarely emerge in cluster analyses, is basing a literature on its existence useful? Said another way, if there is no generalizable balanced profile, how and why should it be considered to be optimal? The importance of this question is reinforced both by findings herein and from elsewhere. For example, in the Australian data where a balanced profile did emerge, results were not all optimal, and indeed, the past positive cluster performed best. It is worth noting that the largest degree of dissimilarity between these two cluster profiles related to Future TP, where the balanced profile was very high and the past positive profile, very low. Such a finding casts at least some doubt of the validity of deeming high Future TP to be *ideal*, as per the BTP definition and DBTP formula. The findings also raise several questions that this study cannot answer directly. If a nationally representative sample were available in any of these national contexts, (a) what proportion of the participants would have a balanced profile and (b) would individuals who did not have a balanced profile be found to be in psychological distress and in need of psychotherapy?

Results from the three versions of the DBTP reported in the *post-hoc* exploratory analysis in Table 6 (Supplementary Material) also suggest, at least preliminarily, that the positive associations of the DBTP may be due in part to the temporal dimension of the outcome variables, with a *positive past* combining with either a positive present (in the case of all five outcomes) or positive future (in the case of optimism). Although it could be argued that the DBTP finding in the Australian data could result from a relatively small sample size, the same cannot be said for the results reported by McKay et al. (2014), where a future, and not a balanced, profile was associated with the least problematic adolescent alcohol consumption. It should be noted that Boniwell et al. (2010) also reported positive outcomes for different balanced profiles. Furthermore, although it is possible that the Australian sample findings are an anomaly, due to some unmeasured cultural difference that sets it apart from the other samples, this is unlikely. Specifically, the historical and current links between Australia and the United Kingdom, for example, mean that there are many cultural similarities between citizens of these two nations, and certainly more similarity than between, say, UK citizens and Slovenians.

Results for the DBTP construct do suggest that this operationalization of the ZTPI is a good marker for well-being. In fact, scores on all but one well-being indicator achieved a minimum practical effect size in the DBTP analyses, with a number achieving a moderate effect size. However, although of some interest, these findings raise questions about the rationale behind *creating* a DBTP score, with little evidence in the extant literature for the so-called expected means in the DBTP equation. As already suggested above, this DBTP creation would seem to be artificial, and there is no reason to believe that manipulation of the expected means in the DBTP equation would not, in fact, yield findings with larger effect sizes than currently emerged. Our results demonstrated that calculation of a *revised* DBTP resulted in similar outcomes, which contradicts the claim that the Stolarski et al. (2011) DBTP is *the* ideal profile.

Rather, the present results suggest that a positive past coupled with either a positive present or a positive future time perspective is potentially adaptive, but this is dependent on the outcome of interest. This hypothesis is supported by several recent studies in which positive time attitude profiles (high positive attitudes to past, present and future and low negative attitudes to past, present and future) were the most adaptive (e.g., Andretta, Worrell, & Mello, 2014). However, as mentioned above, there may be some question about the benefit of high future scores as part of the BTP formulation, at least for some samples and in relation to some outcomes. Therefore, there may be no added value to the DBTP score other than an acknowledgement of the benefits of positive time perspectives across multiple periods. Additionally, it is possible to calculate *ideal* profiles on the basis of other time constructs in the literature such as time attitudes, temporal focus, or consideration of future consequences, and these may well result in more adaptive outcomes than the DBTP. In sum, despite the positive correlates of the DBTP, calling it ideal or optimal is premature.

Further to this, it may be that there is a need to broaden our thinking on time perspective profiles to acknowledge that different profiles are likely to be ideal in different situations. This goes to the heart of Zimbardo and Boyd's (1999) original conceptualization of BTP as a dynamic and adaptive process, which is not what is currently being assessed in the numerous studies on BTP profiles and DBTP. Moreover, it is likely that profiles with different TP biases are actually ideal for a range of different outcomes, depending on the context. Using the example of the Big

5 personality traits, although high Neuroticism is always problematic, different profiles are considered more or less beneficial for a range of outcomes. For example, although high extraversion, agreeableness and openness would be beneficial for a salesperson, a more ideal profile for a researcher would include high conscientiousness and openness, and at least moderate levels of introversion. As such, a positive step forward in time perspective research may be to discard the notion of a single, ideal BTP and investigate a range of profiles that are beneficial for different outcomes, in different contexts and perhaps at different stages of life.

Limitations of cluster analysis

A further important observation relates to the multiplicity (eight in total) of profiles that emerged across the five samples. Although the balanced emerged only once, three other profiles also emerged only once. The only consistently emerging profile was the ambivalent one, whereas the past negative and the past negative-/present-oriented profiles emerged in two different samples. This finding raises an important question for the study of time perspective. Although cultural differences in time perspective have been widely studied and demonstrated using ZTPI scale scores (e.g., Sircova et al., 2015), emerging studies using cluster analyses suggest that cross-cultural comparisons might be problematic. This concern applies equally to the equation-derived DBTP profile based on a Polish sample as it does to the results of cluster analyses.

Although sample-specific results are instructive, the lack of consistency or generalizability of profiles across studies provides fruit for future research. Namely, do unique sample differences in ZTPI scores result in erroneous differences in ZTPI profiles across samples? ZTPI profiles are developed using standardised scores, so that elevations in scores are relative to the sample not the population. This method might confound the generalizability of profiles across studies because sample specific characteristics shape the interpretation of profiles. To provide an example, most University students in a specific sample might report high future scores relative to other populations because they are heavily invested in the future benefits of their education. If so, the ZTPI profile with the most pronounced future scores will be misleadingly shown to harbour somewhat unimpressive future scores through conversion to *T*-scores. At the very least, this hypothesis demands further inquiry.

Methodological limitations

As in much of the literature on the ZTPI, four of the samples in this study were samples of convenience, instruments were administered in different ways, and different outcomes were assessed. Although these differences might be limitations in another study, given the broad claims being made for ZTPI scores, BTP and DBTP (e.g., Sircova et al., 2014; Stolarski et al., 2011; Zhang et al., 2013), this diversity of samples and approaches is a strength in the current study. The diverse range of health and well-being variables assessed in the current study could also be viewed as a limitation, particularly given that many variables were assessed in only one or two of the samples. However, we view this diversity as also being a strength of the study. Specifically, if the BTP profile and DBTP are all they have been theorised to be, then their efficacy must be demonstrated across a wide range of well-being related variables prior to their introduction into clinical practice.

CONCLUSION

Overall, the findings of this study show that a critically important direction of future research would be to reconsider the conceptualization of a BTP. Zimbardo and Boyd (1999) defined balance as "the mental ability to switch flexibly among TPs depending on task features, situational considerations and personal resources rather than be biased toward a specific TP that is not adaptive across situations" (p. 1285). Thus, it may be that measures of TP that assess one's *attention* towards temporal periods, as well as flexibility and adaptation will be especially informative. As an example, some researchers have developed measures that assess an orientation towards a particular time period relative to other time periods (i.e., being "future oriented" vs. emphasising the past, present and future), and have observed meaningful relationships with health outcomes (Bowles, 1999; Mello, Finan, & Worrell, 2013; Mello & Worrell, 2015).

Another potentially useful direction of research could be on the perception one has about the passage of time (Lamotte, Chakroun, Droit-Volet, & Izaute, 2014). Thus, future research examining which elements of time perspective, including orientation, flexibility and the passage of time, have the strongest relationships with health and other adaptive outcomes will greatly move the field forward. In this context, some recent work by Stolarski and Witowska (2017) in the development of the Temporal Metacognition Scale, may also prove helpful. Establishing consistency and robust patterns between TP and human behaviours is necessary for the development of educational or psychological interventions, and these studies will be important to conduct before making claims about which time profiles are indeed ideal and useful in clinical work.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Supplementary Material

Table S1. Results of analyses (Eta squared) of ZTPI variance captured in each of the Cluster Analyses.

Table S2. Results for Differences Between Clusters in Australian Sample (Hedge's g)

Table S3. Results for Differences Between Clusters in British Sample 1 (Hedge's g)

Table S4. Results for Differences Between Clusters in American Sample (Hedge's g)

Table S5. Results for Differences Between Clusters in Slovenian Sample (Hedge's g).

Table S6. Association between three Deviation from Balanced Time Perspective and different scoring approaches and scores on a range of measures (adjusted for age and gender) in Australian sample.

Table S7. Association between Deviation from Balanced Time Perspective (DBTP) and scores on a range of measures (adjusted for age and gender [top line]) in all samples. Below [bolded] shows DBTP results adjusted at step two for the inclusion of ZTPI dimension scores.

Figure S1. Cluster solutions for the Australian and British samples.

Figure S2. Cluster solutions for the American and Slovenian samples.

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