Present and future temporal profiles and their relationship to health intentions and behaviours: a test on a Norwegian general population sample.

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Abstract

We investigated the temporal profiles of a Norwegian general population sample and their relation to health behaviours and intentions. The profiles were based on the variables from the Consideration of Future Consequences Scale (CFCS), the present and future variables from the short form of Zimbardo Time Perspective Inventory (ZTPI), and the combination of both. The analysis revealed that there were only two stable clusters that corresponded to the present and the future profiles. Generally, CFCS-based clusters were more effective at predicting health behaviours and intentions than ZTPI-based clusters. However, the profiles based on the combination of both CFCS and ZTPI variables were more predictive of smoking, exercising, and health intentions than the profiles based solely on the CFCS. However, profiles based on the CFCS variables were more predictive of eating behaviours.

Introduction

Health behaviour has an intertemporal nature. It implies the choice between present and future, where a person invests time and effort in the present, or foregoes immediate gratification in order to obtain better health in the future. Therefore, numerous research projects use the concept of time perspective (TP) to explain health attitudes and intentions (Gick, 2014; Joireman, Shaffer, Balliet, & Strathman, 2012; Sirois, 2004), as well as health behaviour (Daugherty & Brase, 2010; Henson, Carey, Carey, & Maisto, 2006; Keough, Zimbardo, & Boyd, 1999; Orbell & Kyriakaki, 2008; Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005).

The two often used operationalisations of TP are the Consideration of Future Consequences Scale (CFCS) (Joireman et al., 2012; Strathman, Gleicher, Boninger, & Edwards, 1994) and Zimbardo Time Perspective Inventory (ZTPI) (Zimbardo & Boyd, 1999). Consideration of Future Consequences (CFC) is defined as "the extent to which individuals consider the potential distant outcomes of their current behaviours and the extent to which they are influenced by these potential outcomes" (Strathman et al., 1994, p. 743). Later, a two factor CFC-14 model was developed by Joireman et al., 2012, with CFC-immediate (CFC-I) and CFC-future (CFC-F), measuring individual preoccupation with immediate and future consequences respectively. Zimbardo Time Perspective Inventory (ZTPI) (Zimbardo & Boyd, 1999) is a broader conceptualisation of TP reflecting a general focus on past, present, or future. ZTPI includes two past factors: past-positive (ZPP) and past-negative (ZPN) reflecting positive or negative memories of the past respectively, in addition to two present factors: pleasure-seeking and risk-taking present-hedonistic (ZPH), present-fatalistic (ZPF) demonstrating a fatalistic attitude and a lack of control over one's future, and one future factor (ZF) reflecting a focus on future goals.

Earlier research shows that CFCS and ZTPI are related but not mutually exclusive constructs (Crockett, Weinman, Hankins, & Marteau, 2009; Daugherty & Brase, 2010), thus they add extra dimensions to time perspectives. In a recent review article, Joireman and King (2016) encouraged future research on similarities and differences between the present and future time perspectives of ZTPI (Zimbardo & Boyd, 1999) and the CFCS (Strathman et al., 1994).

Most studies of the relationship between time perspective and health behaviour are based on a variable-centred (or attribute-centred) approach, in which individuals are assessed along multiple dimensions summarising stable individual differences in their cognitive, affective, or behavioural focus on the past, present or future (Adams, 2012; Daugherty & Brase, 2010). Naturally, on a variable level, preoccupation with immediate consequences, or focus on the present time, is positively associated with unhealthy behaviours, and negatively linked to unhealthy behaviours. However, care for future consequences, or future time perspective, is often positively linked to healthy behaviours and negatively related to unhealthy behaviours (Adams & Nettle, 2009; Joireman et al., 2012).

In contrast, there has been less emphasis on the ways in which time perspectives are organised within individuals. Individuals have multiple traits, and how those traits are configured within individuals has been used to identify the general personality traits of the NEO Personality Inventory, or other instruments, as different "personality types" for decades (Donnellan & Robins, 2010; Kinnunen, Feldt, Kokko, Tolvanen, Pulkkinen, Metsäpelto, Kinnunen, & Leppänen, 2012). Recently, this approach has been adopted to identify individual temporal profiles (Cole, Andretta, & McKay, 2016; McKay, Andretta, Magee, & Worrell, 2014; Worrell, McKay, & Andretta, 2015).

Unlike the variable-centred perspective that considers relationships between separate TP dimensions and certain health behaviours, the person-oriented approach helps to account for the fact that individuals hold all of the time perspectives that simultaneously form their temporal profile. Zimbardo and Boyd (1999) suggested that TP, as a multidimensional construct, could be a better predictor of behaviour. The authors have also suggested the "balanced time perspective" that allows individuals to switch between time TPs depending on the situation could be "most psychologically and physically healthy for individuals and optimal for societal functioning" (Zimbardo & Boyd, 1999, p. 1295).

Chapman, Duberstein, and Lyness (2007) emphasised the importance of cross-validation of personality profiles as, though they cannot be directly observed, they should occur regularly across different samples. Similar logic can be applied to temporal profiles. The research on the temporal profiles is rather recent, dating back to Boniwell, Osin, Linley, and Ivanchenko (2010) who were among the first to operationalise Zimbardo and Boyd's idea of TP as a multidimensional construct and balanced time perspective. By means of cluster analysis, they established subgroups of individuals sharing similar score patterns on ZTPI variables. Though the temporal profiles that emerged in the previous studies were not uniform in their nature, all the studies found at least present and future profiles (Boniwell et al., 2010; Cole et al., 2016; McKay et al., 2014; Worrel et al., 2015).

The first objective of this paper was to cross-validate personality profiles identified based on the two most often used TP scales: CFCS and ZTPI in a Norwegian context. This work is, to our knowledge, the first to test temporal cluster replicability for different time perspective scales. For the sake of comparison with CFCS that does not have past dimension, we excluded the past dimensions of ZTPI from our analysis. Based on the previous research, we expected to distinguish the present and the future profiles. Moreover, the balanced (Boniwell et al., 2010; McKay et al., 2014; Worrel et al., 2015) or the ambivalent profile (Cole et al., 2016) could emerge.

Our second goal was to test whether the members of particular temporal profiles would be more predisposed to various healthy and unhealthy behaviours, or have higher intentions to take care of their future health. Furthermore, as CFCS and ZTPI variables are not mutually exclusive, we tested whether the profiles identified on the basis of the combination of CFCS and ZTPI variables would be more predictive of health behaviours and intentions.

The previous studies that used the variable-centred approach have established the connection between TP and health behaviour. For instance, Adams (2012) showed that high CFC-I is linked to smoking status and a higher BMI index, and McKay, Percy, and Cole (2013) found a significant negative relation between CFC-F and problematic drinking behaviour. Zimbardo and Boyd (1999) found a positive association between ZPH and alcohol use, and between ZPF and the number of sex partners. Daugherty and Brase (2010) reported positive correlations between ZPH, ZPF, and alcohol and drug use, and a negative relationship to safety belt use and breakfast consumption, whereas there was a significant positive correlation between ZF and physical exercise, breakfast consumption, safety belt and sunscreen use, and a negative association with alcohol and drug use. Zimbardo and Boyd (1999) reported that high ZF people were more likely to prefer nutrition to taste in selecting food. In Barnett, Spruijt-Metz, Unger et al. (2013) ZF was negatively related to marijuana, and hard drug use.

Concerning the person-oriented perspective, Cole et al. (2016) discovered that the respondents from the present profile most often reported hazardous drinking behaviour, followed by the individuals with the ambivalent profile, then future-past negative and future past-positive. McKay et al. (2014) reported that there was a greater portion of abstainers in future and balanced profiles. However, individuals with future but not balanced profile were least at risk of problematic drinking. In light of previous research, we expected that the individuals with a future profile would have more healthy and less unhealthy behaviours, and have a higher score on health intentions than the individuals with the present profile. The present work was the first to test whether CFCS-based or CFCS + ZTPI-based clusters would be more predictive of health attitude and behaviours than ZTPI-based clusters.

Participants and procedure

Participants

A reputable survey company was hired to collect data from a representative Norwegian population sample. A total number of 494 participants, 258 women and 236 men, aged between 18 and 65 (mean = 40), answered an online questionnaire. The questionnaire was translated from English into Norwegian.

Measures

The present work used a short version of ZTPI from Wakefield, Homewood, Taylor, Mahmut, and Meiser (2010) consisting of 5 items per dimension. All items were rated on a 7-point Likert scale ranging from -3 = “strongly disagree” to +3 = “strongly agree”.

We assessed consideration of future consequences using the CFC-14 questionnaire (Joireman et al., 2012), that is the original CFC-12 scale by Strathman et al. (1994) with two additional future-oriented items. All items were rated on a 7-point Likert scale ranging from -3 = “strongly disagree” to +3 = “strongly agree”.

Health intentions were measured with 6 items asking whether individuals were planning/ expected/ wanted to take care of their health in 1 and 20 years. All items were rated on a 7-point Likert scale ranging from -3 = “strongly disagree” to

+3 = “strongly agree”. Smoking behaviour (SB) was a continuous variable assessed with one question: “On average, how many portions (i.e., number of cigarettes/pipes) per day have you smoked during the last month?” with responses being estimated using a 9-point scale where 1 = 0, 9 = 60 or more portions.

Unhealthy eating was represented by three variables: eating cakes, unhealthy (sweet/salty) snacks, and drinking beverages with high sugar content. The items were measured on a 9-point scale ranging from 1 = several times per day, 9 = never. Healthy eating was represented by two variables: eating fruit and eating vegetables. The items were measured on a 9-point scale ranging from 1 = several times per day, 9 = never.

The two physical activity variables included were walking and exercising status. The items were measured on a 7-point scale ranging from 1 = every day, 7 = never. The scores on healthy eating, unhealthy eating, and physical activity were reversed for the analysis so that the higher score would represent a higher behaviour frequency.

Analytical methods and procedures

First, we performed factor analyses on ZTPI and CFCS with the help of SPSS 24 and removed items with low factor loadings and high cross loadings. Then, an average value of each temporal variable was calculated. Next, we identified temporal profiles in the sample by performing cluster analyses ZTPI, CFCS and ZTPI+CFCS as base variables in SPSS 24 in accordance with the following procedure. First, we executed hierarchical cluster analyses, Ward’s method, in order to identify the number of clusters and initial cluster centroids. Then, we used K-means cluster analyses with a simple Euclidean distance similarity measure to fine-tune our cluster solution. The input variables were standardised prior to analysis (Hair, Anderson, Tatham, & Black, 2014). In Clatworthy, Hankins, Buick, Weinman, and Horne (2007) this method was shown to perform best for large sample sizes (N > 300). In order to validate the cluster solutions, the sample was randomly split in half, and a cluster analysis of each half was performed, and the results of these analyses were compared. Another way to validate the cluster solution is to show its value to the field of study (Clatworthy et al., 2007. Through one-way ANOVA analysis performed in SPSS, we established cluster differences on various health behaviour variables.

RESULTS

Principal component factor analyses with Varimax rotation revealed that all items loaded their corresponding factors with the exception of a ZPH item “I make decisions on the spur of the moment”. In addition, two CFC-I items “My convenience is a big factor in the decisions I make or the actions I take” and “Since my day-to-day work has specific outcomes, it is more important to me than behaviour that has distant outcomes” had rather low loading, r =.505 and .502 respectively. These items were excluded from further analyses. The constructs with the remaining items demonstrated good reliability with the following Cronbach’s

alphas: α = .8 for ZPH, α = .75 for ZPF, α = .77 for ZF, α = .85 for CFC-I, and α = .84 for CFC-F.

Cluster solutions

First, we performed three hierarchical cluster analyses, Ward's method: with only ZTPI variables, with only CFCS variables, and with the combination of ZTPI and CFCS variables as a base for clustering. The inspection of the agglomeration coefficients and the dendrograms (Hair et al., 2014) revealed that the optimal cluster solution in all cases could be a 2-cluster model. The cluster centres that resulted from the hierarchical analysis were used as initial cluster centroids for the subsequent K-means analyses. The results of this analysis are summarised in Figure 1. As we can see from the analyses, the two clusters that emerged in all three analyses can be characterised as Present and Future Profiles, with the first cluster (n = 298, 60.3%) scoring high on all present variables and low on all future variables, and the second cluster (n = 196, 39.7%) scoring high on future variables and low on present variables. In order to validate the cluster solutions, we split the sample in half randomly and performed cluster analyses in both halves. The clusters found in both halves were similar to the clusters that resulted from the full sample. We also tested three-cluster solutions, but the clusters were not stable as they were different in two randomly split halves of the sample.

Figure 1 about here

Predicting health behaviour

Generally, the individuals with the Present profile reported less healthy behaviours and scored lower on health intentions than the individuals in the Future profile. As presented in Table 1, the profiles divided only based on ZTPI variables did not differ significantly on most health behaviours and intentions except for exercising (F = 4.64). The profiles identified based on CFCS variables differed significantly on smoking (F = 11.43), unhealthy drinks (F = 10.96), healthy vegetable (F = 19.87) and fruit eating (F = 4.85), and exercising (F = 6.31). The profiles divided based on the clustering variables from both ZTPI and CFCS differed significantly on smoking (F = 12.16), vegetable consumption (F = 9.87), walking (F = 6.39), and exercising (F = 11.4). In the case of healthy and unhealthy eating, the profiles identified on the basis of ZTPI + CFCS variables were less different than the profiles established on the basis of CFCS only based profiles (F = 10.96, 19.87, 4.85 versus F = 3.62, 9.87, 2.76 respectively). However, in the case of smoking, exercising, and health intentions, ZTPI + CFCS based profiles were more different than CFCS based profiles (F = 12.16, 11.14, 13.6 versus F = 11.43, 6.31, 4.165 respectively).

Table 1 about here

Discussion

The present work contributed to the existing body of knowledge in several ways. First, we tested the replicability of the temporal profiles based on different TP scales. While previous studies used ZTPI variables as a base for creating temporal profiles, our study was the first to incorporate CFCS in addition to ZTPI-based profiles. The three cluster analyses, that is, with present and future dimensions of ZTPI, CFCS and with the combination of ZTPI and CFCS variables as a base, resulted in a similar two-cluster solution. Similar to the earlier studies (Boniwell et al., 2010; Cole et al., 2016; McKay et al., 2014; Worrel et al., 2015), we found present and future profiles. The present profile was characterised by high present hedonistic, present fatalistic, and consideration of immediate consequences and low Zimbardo future time perspective and consideration of future consequences. The individuals in the future profile scored above average on Zimbardo future time perspective and consideration of future consequences, and below average on present hedonistic, present fatalistic, and consideration of immediate consequences.

We did not find a cluster that could represent a balanced (Boniwell et al., 2010; McKay et al., 2014; Worrel et al., 2015) or the ambivalent (Cole et al., 2016) temporal profile in the Norwegian context. Although our study incorporated only present and future TP variables, the balanced profile could have been characterised by relatively high CFC-I, CFC-F and ZPH, and low ZPF, whereas individuals in the ambivalent profile could have scored average on all dimensions. The validation tests showed that the two-cluster solution was stable and replicable in randomly divided samples, whereas the three-cluster solution could not be replicated in the split samples.

Second, the study revealed which variables contribute to identifying the clusters of individuals that would differ significantly in relation to health behaviours and intentions. The present and future profiles identified based on CFCS variables were more predictive of health behaviours and intentions than ZTPI-based profiles that were not significantly different on most of health behaviours and intentions. CFCS-based profiles differed most on eating habits, whereas individuals from ZTPI + CFCS-based profiles differed most on smoking, physical activity, and health intentions. Thus, the present study demonstrates that ZTPI+CFCS-based profiles might be superior to only CFCS-based profiles when predicting most health behaviours and intentions, whereas CFCS based profiles might be more useful when predicting eating behaviour.

Though the earlier research has found significant relationships between different time perspectives and health behaviour on a variable level (Daugherty & Brase, 2010; Henson et al., 2006; Orbell & Kyriakaki, 2008), the results of the present work might suggest that the person-oriented approach could contribute an additional insight into individual time perspective. ZTPI and CFCS variables are not mutually exclusive, and, using both of them as clustering variables at the same time, accounts for the fact that individuals have these time perspectives simultaneously.

The general limitation of the present study is its non-experimental design that prevents us from drawing conclusions about causality. Thus, we encourage future research on the influence of membership in TP segments on health attitudes and behaviour to use an experimental design. Moreover, self-report measures of health behaviour could be susceptible to social desirability and social approval biases (Paul, Rhodes, Kramer, Baer, & Rumpler, 2005; Prince et al., 2008). Nevertheless, behaviour frequency questionnaires remain commonly used for accessing habitual behaviours when establishing links between time perspectives and health behaviour (Hall and Fong, 2003; Henson et al., 2006; McKay et al., 2013; Strathman et al., 1994).

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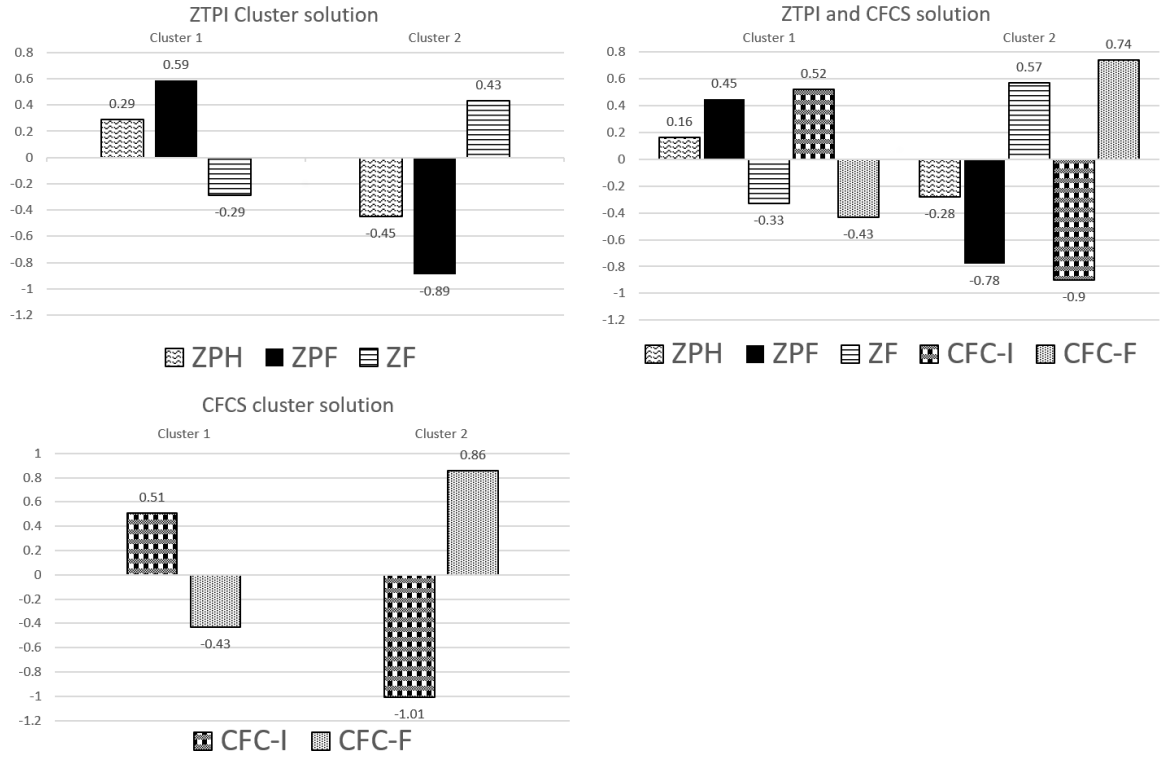

Figure 1. Standardised cluster means of temporal profiles based on ZTPI, CFCS, and combined ZTPI and CFCS variables. K-means analysis, K = 2. Cluster 1 n = 298 (60.3%), cluster 2 n = 196 (39.7%). ZTPI = Zimbardo Time Perspective Inventory, CFCS = Consideration of Future Consequences Scale, ZPH = Zimbardo present hedonistic, ZPF = Zimbardo present fatalistic, ZF = Zimbardo future, CFC-I = consideration of immediate consequences, CFC-F = consideration of future consequences.

Table 1. The results of ANOVA post-hoc tests of ZTPI, CFCS, and ZTPI + CFCS based clusters

Dependent variables	**Mean (SD)**		**ANOVA**	
Health behaviour	**Present profile**	**Future Profile**	**F**	**p**
Smoking				
ZTPI based	2.15 (1.91)	1.83 (1.71)	3.69	.055
CFCS based	2.22 (1.99)	1.63 (1.45)	11.43	.001
ZTPI + CFCS based	2.24 (2.00)	1.65 (1.46)	12.16	.001
Unhealthy cakes				
ZTPI based	3.51 (1.55)	3.32 (1.29)	2.11	.147
CFCS based	3.49 (1.49)	3.32 (1.36)	1.54	.215
ZTPI + CFCS based	3.52(1.52)	3.29 (1.32)	2.90	.089
Unhealthy drinks				
ZTPI based	3.91 (2.18)	3.70 (2.16)	1.07	.301
CFCS based	4.05 (2.25)	3.37 (1.93)	10.96	.001
ZTPI + CFCS based	3.96(2.21)	3.58 (2.09)	3.62	.058
Healthy vegetables				
ZTPI based	6.65 (1.76)	6.93 (1.61)	3.07	.080
CFCS based	6.52 (1.76)	7.23 (1.49)	19.87	.000
ZTPI + CFCS based	6.58 (1.77)	7.08 (1.54)	9.87	.002
Healthy fruit				
ZTPI based	6.36 (1.90)	6.49 (1.98)	.585	.445
CFCS based	6.28 (1.91)	6.68 (1.95)	4.85	.028
ZTPI + CFCS based	6.30 (1.90)	6.60 (1.97)	2.76	.097
Walking				
ZTPI based	4.78 (1.62)	5.05 (1.63)	3.20	.074
CFCS based	4.80 (1.56)	5.04 (1.75)	2.34	.127
ZTPI + CFCS based	4.74 (1.61)	5.13 (1.65)	6.39	.012
Exercising				
ZTPI based	3.80 (1.77)	4.14 (1.69)	4.64	.032
CFCS based	3.80 (1.75)	4.21 (1.71)	6.31	.012
ZTPI + CFCS based	3.74 (1.77)	4.28 (1.65)	11.14	.001
Health intentions				
ZTPI based	5.47 (1.22)	5.67 (1.14)	3.27	.071
CFCS based	5.47 (1.21)	5.70 (1.14)	4.165	.042
ZTPI + CFCS based	5.40 (1.23)	5.80 (1.07)	13.60	.000

Note: ZTPI = Zimbardo Time Perspective Inventory, CFCS = Consideration of Future Consequences Scale, SD = standard deviation.