



UMEÅ UNIVERSITET

**DEVIATION FROM A  
BALANCED TIME  
PERSPECTIVE AMONG  
OLDER ADULTS IN  
RELATION TO GLOBAL  
COGNITIVE FUNCTIONING**

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## Abstract

The present paper is based on Zimbardo and Boyd's (1999) Time Perspective (TP) theory, and is concerned with the relationship between global cognitive functioning and deviations from balanced time perspective (DBTP) in a sample of older adults. The study investigated whether Present Fatalistic (PF) sub-scale of the Swedish-Zimbardo Time Perspective Inventory (S-ZTPI, Carelli et al., 2011) is the driving force behind the higher deviation from Balanced Time Perspective (BTP) and how it relates to cognitive decline (Rönnlund et al., 2017). Towards this end, a group of 24 older adults with low scores on Mini-Mental State Examination (MMSE) ( $\leq 24$ ; Folstein and McHugh, 1975) was compared with an age, sex, and education-matched group of participants scoring in the normal range. The results confirmed that the low-MMSE group exhibited a higher mean DBTP score than the normal group and showed that this was mainly attributable to high scores on PF. No group difference was observed on a measure of depression, enforcing the conclusion that the difference was not due to a difference in mood state. Results of DBTP and PF relations in later years may relate to loss of control as cognitive functions decline and feelings of hopelessness and helplessness increases. Further research could be conducted on bigger sample size and include longitudinal studies to investigate the change of balance in relation to PF sub-scale, cognition and age.

Keywords: Time perspective, aging, cognition, balanced time perspective, present fatalistic sub-scale

## Abstrakt

Föreliggande studie bygger på Zimbardo och Boyds (1999) teori om tidsperspektiv (TP), och fokuserar på förhållandet mellan global kognitiv funktion och avvikelser från "balanserat tidsperspektiv" (BTP) i ett urval av äldre vuxna. Studien undersökte också om delskalan "Present Fatalistic" (PF) i den svenska versionen av Zimbardos "Time Perspective Inventory" (S-ZTPI, Carelli et al., 2011) är drivkraften bakom den högre avvikelsen från ett balanserat tidsperspektiv (BTP) och hur det relaterar till kognitiv nedgång (Rönnlund et al., 2017). Mot denna bakgrund jämfördes två grupper, en grupp av 24 stycken äldre vuxna deltagare med låga poäng på testet "Mini-Mental State Examination" (MMSE) ( $\leq 24$ ; Folstein & McHugh, 1975) och en andra grupp bestående av ålder-, kön- och utbildningsmatchade deltagare inom normalintervallet. Resultatet bekräftade att gruppen med låg MMSE uppvisade en större genomsnittlig DBTP-poäng än gruppen inom normalintervallet. Dessutom visades att detta främst berodde på höga poäng på PF-skalan. Ingen gruppsskillnad observerades i mått av depression, vilket ledde till slutsatsen att utfallet inte berodde på skillnader i affektivt tillstånd. Resultaten av DBTP och PF-relationerna i äldre ålder kan relateras till förlust av kontroll eftersom kognitiva funktioner minskar, samtidigt som känslor av hopplöshet och hjälplöshet ökar. Ytterligare forskning kan genomföras på större provstorlek och omfatta longitudinella studier för att undersöka förändringen av balans i förhållande till PF-delskala, kognition och ålder.

Nyckelord: tidsperspektiv, åldrande, kognition, balanserat tidsperspektiv, present fatalistic subskala

## Deviation from a Balanced Time Perspective among Older Adults in Relation to Global Cognitive Functioning

Research in social and cognitive psychology suggests the way an individual relates to time (past, present, future), their so called time perspective (TP), has a great effect on their behavior, mood, (Lewin, 1951; Stolarski, Matthews, Postek, Zimbardo, P. G., & Bitner 2014), their psychological and physical well-being and prospect of life (Zimbardo & Boyd, 1999). Since most of the studies in the area have been conducted involving young subjects, the relation between TP and aging is still mostly an uncharted territory.

There are different frameworks existing for the study of time perspective in today's psychological research. However, the present paper is based on Zimbardo and Boyd's (1999) Time Perspective theory. This theory falls into the category of subjective time perspective framework and is concerned with how individuals relate to the past, are aware of the present, and anticipate the future. In Zimbardo and Boyd's framework time perception is defined as "the often nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories, or time frames, that help to give order, coherence, and meaning to those events" (Zimbardo & Boyd, 1999, p. 1271).

The stream of time is interpreted through the knowledge of the present, as stated in one of the early definitions of William James: "Time perspective is the knowledge of some other part of the stream, past or future, near or remote, that is always mixed in with our knowledge of the present thing." In this subjective view of time, one's experience is filtered through the present moment, which is effected by the totality of the past and the future. As the social psychologist's, Lewin's definition of time perspective, that Zimbardo and Boyd (1999) used as a starting frame for their initial work, defined time perspective as 'the totality of the individual's views of his psychological future and psychological past existing at a given time' (Lewin 1951, p. 75).

Nutin (1985) drew attention to the cognitive part of time perspective when stated that "future and past events have an impact on present behavior to the extent that they are actually present on the cognitive level of behavioral functioning" (1985, p. 54). Lennings later expands this definition, while acknowledging the vitality of the cognitive aspects of the process, he further emphasized the importance of emotions, and introduces the notion of preferred temporal zones. In his view, time perspective is "a cognitive operation that implies both an emotional reaction to imagined time zones (such as future, present or past) and a preference for locating action in some temporal zone" (Lennings, 1996, p. 72).

Zimbardo and Boyd (1999), agree with Lennings (1996) that there are individual differences in where the dominant influence of our decisions, judgments and actions come from. They are part of the cognitive processes (Zimbardo & Boyd, 1999; Kenough, Zimbardo, & Boyd, 1999) and an individual might be anchored in the past, ruminating, thinking about the "good all days", and their views in the present are influenced by the effect of this way of thinking. While others, anchored in the future, might think more about the consequences of a certain action, and another individual who 'lives for the moment' might not be concerned with either of these variances and give themselves to the enjoyment of the here and now. Their decisions are mainly based on biological and sensory clues.

How one utilizes the different time frames is less ascribed as a personality type but more as an underlying process that the individual is not aware of, thus they are non-conscious. Everyone's TP profile is a unique mix of the five factors (Zimbardo & Boyd, 1999). They emphasized that TP profiles differ as much from personality profiles as they are not fixed so with specific attention, for example therapy (Sword, Sword, Brunskill, & Zimbardo, 2014), can be changed.

In their original work, Zimbardo and Boyd (1999) distinguished between five temporal zones across past, present and future. The five original time dimensions suggested are Past Negative (PN), which is defined as a pessimistic view of one's past, with the tendency for negative remuneration. Past Positive (PP), which is a warm, many times sentimental view of one's past, where there is an emphasis on time spent with family and friends. Present Hedonistic (PH), where the individual lives in and for the moment, many times ignoring future consequences and taking unnecessary risks that are driven by new sensations and adventures. Present-Fatalistic (PF), is a hopeless and helpless view of life. This temporal zone recalls a strong external locus of control, where the individual believes that outside sources, government, spiritual forces direct their lives and they have no or little influence over the outcomes. The fifth temporal zone is the Future (F) time. The emphasis on this temporal zone shows strong work ethics toward future goals, many times at the expense of present enjoyment.

### **Measuring Time Perspective**

There have been several attempts in modern psychology research to develop instruments to measure time perspective. These measurements concentrated mainly on one or more of the time frames, mostly on future TP. They failed to capture the multidimensional aspect of TP and had difficulties with reliably and easily scoring the instruments. (Boniwell & Zimbardo, 2004). Some of these instruments are the Circles Test (Cottle, 1976), the Time Lines (Rappaport, Enrich, & Wilson, 1985; Rappaport, 1990), the Consideration of Future Consequences Scale (CFC; Strathman, Gleicher, Boninger, & Edwards, 1994), the Time Perspective Questionnaire (TPQ; Fong & Hall, 2003).

In order to eliminate some of the shortcomings of the above tests, Zimbardo & Boyd (2008) developed a multidimensional TP measurement that included all three time dimensions. They tried to create an integrative approach, where the administration and the individual measurement became easier and more homogeneous. It has been validated by multiple studies in different populations (D'Alessio et al., 2003; Milfont, Andrade, Pessoa, & Belo, 2008; Worrell & Zeno, 2007).

Originally Zimbardo & Boyd (2009) used a one-dimensional Future TP. Carelli, Wiberg & Wiberg (2011) later extended the five sub-scales with the polarization of Future TP to differentiate Future Positive (FP) and Future Negative (FN) scales. Creating a six-factor structure called Swedish-Zimbardo Time Perspective Inventory (S-ZTPI). They showed the relevance of including and working with the notion that part of being focused on the future can be accounted for the avoidance of negative consequences (Barlow, 2004), while the original ZTPI mostly contained items for anticipation of good outcomes.

### **Balanced Time Perspective (BTP)**

Although an individual TP frame can have various positive and negative psychological effects, Boniwell & Zimbardo (2004) suggests that by overusing any of the time frames individuals might develop a temporal bias toward that specific temporal time frame, which in return prevents them to flexibly changing between temporal zones and adapt to life's situational challenges.

In contrast to this biased and inflexible time orientation, the more beneficial and healthy TP proposed by Zimbardo & Boyd (1999) is called Balanced Time Perspective (BTP). BTP is a flexible mode of switching between the temporal zones, utilizing cognitive processes depending on the situational need. Based on the need, one time frame can come to the forefront while others may temporarily receive less attention. This non-biased modus operandi helps the individual adopt to different situational demands of life, and to live a

happier life (Stolarski, Bittner, & Zimbardo, 2011). For example, when someone is working or planning it is beneficial to use future time perspective, however, when this time frame is overused can be contra effective for relaxation or for spending time with family. In the later situation, by switching to a past positive time frame, it can help appreciate the moment and time spent with important people. The suggestion is that this is a “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.” (Zimbardo & Boyd, 1999, p.1285)

Boniwell & Zimbardo (2004) in their nominal work proposed a theoretical ideal and most desirable healthy mix of time frames for BTP. However, originally they did not set specific parameters, they suggest that the most beneficial mix is when someone is high in Past Positive, moderately high in Future and Present Hedonistic, and low in Past Negative and Present Fatalistic TP dimensions (Boniwell & Zimbardo, 2004; Boyd & Zimbardo, 2008). In this proposed ideal mix (Boyd & Zimbardo, 2008), one has a warm, somewhat sentimental view of their past, that gives them roots and a sense of continuity of life. The person with BTP is moderately driven toward future goals and achievements and is filled with hope and optimism, while present hedonism gives them the ability to be able to enjoy the moment and be exuberant over life. Past Negative and Present Fatalistic when too high carry only negative consequences.

Different attempts have been made to capture the complexity of BTP structure. Initially attempts (Drake, Duncan, Sutherland, Abernethy, & Henry, 2008; Boniwell, Osin, Linley, & Ivanchenko, 2010) were trying to set a cut point or an optimal level, differentiating between ‘healthy’ and ‘non-healthy’ individuals that resulted in too many participants falling into the unbalanced category. The most frequently used method today in research is the Deviation of Balanced Time Perspective (DBTP; Stolarski et al., 2011; Zhang et al., 2013) measurement that is a continuous measurement, which calculates the deviation from the optimal points suggested by Philip Zimbardo on Time Paradox webpage ([www.thetimeparadox.com/surveys/](http://www.thetimeparadox.com/surveys/)). The deviation measurement depicts an overall distance from the optimal score to show how ill-balanced an individual might be. (For more see *Materials*).

### **Balanced Time Perspective in Later Life**

BTP has been associated with various psychological outcomes. Higher BTP scores have been linked to higher levels of optimism (Sobol-Kwapinska & Jankowski, 2016), positive functioning (Boniwell et al., 2010), life satisfaction (Stolarski, & Cyniak-Cieciura, 2016) and subjective wellbeing (Drake et al. 2008; Webster, Bohlmeijer, & Westerhof, 2014). Higher deviations from BTP negatively effects mood and brings about greater tension and depressive symptoms (Stolarski et al., 2014).

Until now, very few researches have investigated the relationship between BTP and cognitive functions, and even less concerning aging. Even time perspective research conducted on sub-scales have been done on young people, very few on the elderly and even those usually do not reflect the entirety of all the sub-scales.

One of the first studies (Desmyter & Raedt, 2012) with the elderly to establish a relation between ZTPI and subjective well-being involved 149 older people, aging between 65 and 96. They tried to establish relationship between the five dimensions of TP based on the ZTPI (Zimbardo & Boyd, 1999), subjective well-being and affect. Although, they did not check the sample for cognitive impairment, they found that Past Positive TP was positively correlated with satisfaction with life and positive affect. A higher hedonistic present view was related to higher positive affect, while those scoring higher on Present Negative and Present

Fatalistic were more prone to depression. There was no significant difference in the preference of certain time frames in the ‘young’ and ‘older’ elderly.

Another study on aging and TP found associations between aging and BTP (Rönnlund, Åström, & Carelli, 2017). They examined the relationship between BTP and subjective well-being in older adults between 60-90 years. They used three alternative methods to assess BTP, and found that in all three cases, there was a significant relation between loss of balance and aging. They suggested, that one of the underlying factors for loss of balance in older age might be due to the increased scores in Present Fatalistic sub-scale. They speculated that in older ages, the loss of balance might be even higher, especially if the individuals have a deficit in cognitive functioning.

A study trying to find associations between BTP and cognitive functions have been conducted by Zajenkowski, Stolarski, Maciantowicz, Malesza, & Witowska (2016). They found that the more balanced the TP profile was, the higher fluid intelligence scores were attained. They concluded that, although further research is needed, “cognitive abilities play an important role in adoption of temporal balance” (Zajenkowski et al., 2016a, pg.1).

Two additional studies examining executive control and TP sub-scales found positive correlation between cognitive abilities and TP. Present Fatalistic and Past Negative sub-scales were both negatively associated with executive control in relation to fluid intelligence (Zajenkowski, Stolarski, Witowska, Maciantowicz, & Łowicki, 2016; Witowska & Zajenkowski, 2018), but only Present Fatalistic sub-scale showed negative association with inhibition (Witowska & Zajenkowski, 2018) and also with verbal intelligence (Zajenkowski et al., 2016b). All the above mentioned three studies on cognition and TP relationship were conducted with young adults.

## **Study Aims and Hypothesis**

The present study is trying to answer this proposed gap in research by Rönnlund et al. (2017), whether the lack of balance in older age is driven by deficit in cognitive performance. We expected (H1) that individuals with lower scores on a screening test of cognitive dysfunction (MMSE) would show larger deviation from balance compared with a group with MMSE scores within the healthy range. Furthermore, if one of the main driving factors behind the bigger deviation is the increased Present Fatalistic TP sub-scale, the low-performing group might be expected to score significantly higher than the control group on the PF subscale (H2).

## **Method**

### **Participants and Procedure**

The participants were enrolled in the Betula prospective cohort study, a longitudinal study of aging, memory and health in Umeå, Sweden, between 1988 and 2014 (see Nilsson et al., 1997, 2004). The present study is based on Sample 1 and 3 of the random sampling from the population registry in Umeå municipality. The testing was repeated every five years, with six different testing occasions. The present study is based on the last testing (T6; 2013-2014) where there were 456 elderly involved, who in addition to repeated cognitive tests that were administered at each previous testing occasion, including the Mini Mental State Examination (MMSE; Folstein, & McHugh, 1975), completed the Swedish Version of ZTPI (S-ZTPI) for the first time at T6.

## Ethical Considerations

The present study was conducted following the guidelines and ethical standards of the National Statement on Ethical Conduct in Human Research (Australian Government, 2007). The participants were informed about their rights and consent was provided by the participants. All data were decoded and anonymous, and were confidentially handled in all processes.

## Inclusion Criteria for the Current Study

Out of the last testing of the Betula Study (T6; N = 456) those who (1) scored lower than 25 points on the Mini Mental State Examination (MMSE; Folstein et al., 1975) but did not have severe cognitive impairment (MMSE scores lower than 18 points, Folstein et al., 1975), and (2) filled in at least 80% of the S-ZTPI test (Carelli et al., 2011), were chosen for the present study.

Based on the inclusion criteria, out of 456 tested individuals, 24 were included in the present study and were matched with a control group (n = 24). The low MMSE scored group (low-MMSE group) was matched with a control group of healthy cognitive functioning individuals from the same cohort (normal MMSE group). They were matched on age, sex, furthermore, since MMSE scores are sensitive to education, also on educational years. Characteristics of the sample are listed in Table 1.

Table 1

*Sample characteristics, MMSE and Depression Scale scores across groups. (M (SD))*

Characteristic	Low performing (n = 24)	Normal performing (n = 24)
Age, years	76.67 (5.25)	76.67 (5.25)
Sex, (n)		
Female	6	6
Male	18	18
Education, years	6-16 (M = 8.87; 2.92)	6-15.5 (M = 9.45; 2.89)
MMSE	23.38	29
Depression Scale*	9.63 (6.36)	7.29 (6.34)

Note: \* $t_{(46)} = 1.27, p = 0.21$

## Materials

### MMSE

The Mini-Mental State Examination (MMSE; Folstein et al., 1975) is a screening method that is extensively used in medical research to test cognitive impairment associated with aging. It identifies risk factors for dementia, while testing attention, registration, recall, language, orientation to time and place, and ability to adequately follow complex commands. The maximum score is 30 points. Scores greater than or equal to 24 points indicate normal cognition; lower scores might point to mild (18-23) or severe cognitive impairment (0-17). The test evaluation points out that higher than 25 points is the indicator of decreased odds of dementia. Internal consistency reliability measured by Cronbach's alpha (McDowell, Kristjansson, Hill, and Hebert, 1997) is satisfactory (.78).

## Swedish Zimbardo Time Perspective Inventory (S-ZTPI)

The original version of the ZTPI questionnaire (Zimbardo & Boyd, 1999) is a self-report tool that consists of 56 items and five sub-scales, Past Negative, Past Positive, Present Hedonistic, Present Fatalistic and Future.

Carelli et al. (2011) extended the five dimension of the ZTPI to include the differentiation of Future TP scale. The new six-factor-structure (S-ZTPI) comprises of 64 questions. Compared to the original, it also measures Future Negative (FN) and Future Positive (FP) TP scales. Two of the original thirteen questions in the ZTPI Future sub-scale have been moved into the new Future Negative sub-scale and eight more new questions from ZTPI were added ( $n = 10$ ), while the rest of the original questions ( $n = 11$ ) was renamed as Future Positive. The results are rated on a five-point Likert scale, ranging from 1 (*very uncharacteristic*) to 5 (*very characteristic*). The new six-factor-structure has been validated and have been found satisfactory (Carelli et al., 2011).

## Deviation from Balanced Time Perspective (DBTP)

Stolarski et al. (Stolarski, Bitner, & Zimbardo, 2011) proposed a reliable and continuous calculation for BTP labeled Deviation from Balanced Time Perspective (DBTP). The method used in this paper to compute DBTP is suggested to be the most reliable method to compute BTP based on ZTPI (Stolarski et al. 2015; Zhang et al. 2013).

The DBTP is a measure of distance from the Balanced Time Perspective scores first introduced by Zimbardo and Boyd (2008). A score of zero indicates an idealized perfect balance, therefore lower scores indicate a more balanced result, while high scores indicate more ill-balanced profiles. The present study uses the extended version of DBTP measure (DBTP-E) that is in line with the Swedish version of ZTPI (S-ZTPI). In this measure, additionally to the original five-scale deviation scores, the deviation results for the valanced Future sub-scale scores are included (Carelli et al. 2011; Rönnlund et al. 2017).

The computing of DBTP-E involves subtracting each observed score ( $o$ ) from the expected score ( $e$ ), then squaring it to eliminate negative values, and taking the square root of the sum,  $\sqrt{(oPN-ePN)^2+(oPP-ePP)^2+(oPF-ePF)^2+(oPH-ePH)^2+(oFP-eFP)^2+(oFN-eFN)^2}$  (Stolarski, Wiberg, & Osin, 2015). The expected scores for the individual sub-scales are:  $ePN=1.95$ ,  $ePP=4.60$ ,  $ePF=1.50$ ,  $ePH=3.90$ ,  $eF=4.00$ ,  $eFN=1.8$  (Rönnlund et al. 2017).

## Scale Center for Epidemiological Studies Depression Scale (Ces-d)

Depressive symptoms were tested using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) that consists of 20 questions. The statements have to be assessed on a 4-point Likert scale, ranging from 0 (*Rarely, less than 1 day*) to 3 (*Most, 5-7 days*) to indicate how often the individual felt according to the question the previous week. The maximum points attainable are 60. A score equal or higher than 16 points is considered depressed. The validity of the scale is found reliable ( $\text{Alpha} > .85$ ) (Hann, Winter, and Jakobsen., 1999).

## Results

There were missing data the in low-MMSE group in six cases, based on the inclusion criteria, the percentage of missing information did not exceed 20% of the total data. The missing data were calculated based on highest correlation with other items in their test values using SPSS version 16. The data was checked for normality.

## DBTP-E

The initial hypothesis was that (H1.) Poorer cognitive functioning is less balanced, and those who score lower on MMSE cognitive test show bigger deviation from BTP than those who score higher and therefore are within the normal range.

First the DBTD-E scores were calculated for each participant in both groups based on the results for the S-ZTPI sub-scales (Table 2.), and the median of the two group results were calculated. The results were for the low-MMSE group (DBTP-E,  $M = 2.61$ ,  $SD = 0.55$ ) and for the normal MMSE group (DBTP-E,  $M = 2.32$ ,  $SD = 0.42$ ). The derived deviation scores from BTP were compared on group level with independent samples t-test to investigate if there was a significant group difference.

Table 2

*Descriptive statistics (M; SD in parantheses) of TP sub-scales for the groups.*

Sub-scale	Low-MMSE ( $n = 24$ )	Normal MMSE ( $n = 24$ )
Past Negative	2.46; (0.63)	2.26; (0.49)
Past Positive	3.71 (0.64)	3.64; (0.39)
Present Fatalistic	2.99; (0.45)	2.58; (0.43)
Present Hedonistic	3.09; (0.35)	2.88; (0.52)
Future Negative	2.71; (0.58)	2.67; (0.38)
Future Positive	3.12; (0.44)	3.33; (0.48)

Originally we assumed a direction of results, that the less balanced group will have higher deviation results, based on this assumption, we used a one-tailed test. As a result the deviation from time perspective was able to distinguish between the low-performing and normal performing groups, while the independent samples t-test ( $t_{(46)} = 2.01$ ;  $p = 0.026$ ; Effect size  $d_{\text{Cohen}} -0.59$ , Confidence interval for  $d_{\text{Cohen}} -1.41, -0.23$ ) revealed, as supposed in (H1), a significant difference between the two groups when comparing deviation from the ideal BTP.

### Individual Sub-Scales

In our second hypothesis (H2.) we assumed that Present Fatalistic TP is the driving factor for loss of balance considering all the sub-scales. Loss of cognitive function correlates with PF TP, the greater the loss of balance, the higher PF scores.

All the six sub-scales that were previously used to determine DBTP scores (Table 2.) were calculated for both groups. Since we were interested if any of the sub-scales showed that our null-hypothesis is true, we compared each sub-scale with the corresponding sub-scales between the low-MMSE and normal MMSE groups, using independent samples t-tests. The results for the independent t-tests are, PN ( $t_{(46)} = 1.18$ ,  $p = 0.24$ ,  $SD = 0.16$ ), PP ( $t_{(46)} = 0.48$ ,  $p = 0.633$ ,  $SD = 0.15$ ), PF ( $t_{(46)} = 3.19$ ,  $p = 0.003$ ,  $SD = 0.12$ ), PH ( $t_{(46)} = 1.63$ ,  $p = 0.11$ ,  $SD = 0.12$ ), FN ( $t_{(46)} = 0.34$ ,  $p = 0.737$ ,  $SD = 0.14$ ), FP ( $t_{(46)} = -1.57$ ,  $p = 0.123$ ,  $SD = 0.13$ ).

Out of all the sub-scales, only the results of the Present Fatalistic sub-scale produced significant result ( $p = 0.003$ ,  $SD = 0.12$ ), showing that the deviation found in the results of the cognitively lower performing group is determined mainly by the higher score attained in the PF sub-scale and that there is relation between lower cognition and PF temporal zone.

## Depression

Although the group with lower MMSE scored on average higher on the depression scale (low-MMSE group:  $M = 9.63$ ,  $SD = 6.35$ ; normal MMSE group:  $M = 7.29$ ;  $SD = 6.34$ ), when compared ( $t_{(46)} = 1.27$ ;  $p = 0.29$ ), there was no significant difference between the two groups. The relationship between lower cognition and depression was anticipated but not found in our study.

## DISCUSSION

In previous researches in younger age cohorts, Present Fatalistic sub-scale has been associated with negative health effects (Desmyter & Raedt, 2012; Stolarski et al. 2014), and too high scores in this sub-scale resulted in more ill-balanced TP profiles, although, these findings have not been thoroughly examined in older age groups. When it comes to aging and the relations of BTP and ill-balance, it has only been speculated that deficit in cognitive functioning might have an effect on age-related increase in PF temporal zone (Rönnlund et al., 2017).

The aim of the present paper was to examine the relationship between DBTP defined by Stolarski et al. (2011), and age related cognitive decline. Our research findings were consistent with our hypothesis. We found that (H1) older people with lower MMSE scores were less balanced than their matched group with higher MMSE scores based on TP theory established by Zimbardo and Boyd (2008). Our other assumption (H2) that Present Fatalistic TP is the driving factor for loss of balance in the elderly in relation to cognitive functioning, was also established. The results showed a strong relationship, even in a relatively small sample size ( $n = 24$ ), between higher attained PF scores and greater deviation from BTP when compared with a control group.

Our findings on cognition and BTP relation point to the same direction as previous research on TP and global cognitive functioning in younger populations (Zajenkowski et al., 2016a; Witowska and Zajenkowski, 2018), and relationship of fluid intelligence and BTP (Zajenkowski et al., 2016b). Although it has been established that normal aging is associated with decline in higher cognitive functions (Rönnlund, Nyberg, Bäckman, & Nilsson, 2005) we further found that the lack of balance in later years is strongly driven by deficit in cognitive performance.

Behind this findings might lay a perceived or real loss of control, loss of cognitive deficiency and health in older age. As people's health decline, they become more dependent on others, which can lead to a feeling of loss of control. In general, when people progress toward a goal they experience greater control that influences their overall well being (Snyder, 1996), which is in line with achieving goals and BTP profiles. Individuals with more balanced TP profiles feel more able and optimistic about achieving their aspirations (Boniwell et al., 2010).

Since the two groups were matched on age, sex and education, it seems that age itself might not be the only driving force of losing balance, but as cognitive health declines people might feel more hopeless and helpless, which in turn effect their TP balance. Since the definition of Present Fatalistic sub-scale (Zimbardo & Boyd, 1999) implies feelings of hopelessness and helplessness, as one loses cognitive functions in later years, they can feel more hopeless and helpless, which in turn influences DBTP scores through PF sub-scale.

Although previous research linked higher PF scores and depression (Desmyter & Raedt, 2012; Stolarski et al. 2014) we did not find this in our study. Both groups showed non-depressive mood states ( $Ces-d < 16$ ) and the difference between the two groups were

statistically non-significant, therefore we could not establish that the more ill-balanced group was also more depressed. In our study, depression did not seem to play a crucial role in making the low-MMSE group more out of balance and thus attaining higher scores on DBTP scale, this enforcing the conclusion that the difference was not due to a difference in mood state.

### **Limitations and Future Recommendations**

The study examined the relationship of BTP and global cognitive functions in later years. A limitation of the study is its small sample size. Further research could be conducted with bigger sample size, and maybe then results could also be drawn to connection of PF tendencies and depression data. Also would be interesting to examine whether there is significant difference in DBTP scores and PF time frame if 'young' and 'older' elderly are differentiated in a study.

Another limitation of the present study is that the testing of ZTPI was only administered at the last testing (T6) of the Betula study. There was no information about the balance scores of individuals from earlier testings, so we do not know whether and how their balance changed with time. Longitudinal studies would be useful to determine the relationship between changes in cognitive decline and BTP in the elderly. Furthermore, to study as a covariant the participants' history, previous traumas, etc, to identify changes.

Also a possible indication and area of future research could be in TP based therapy (Zimbardo, Sword & Sword, 2012). How emphasis on PF sub-scale could be used to screen and help to prevent further cognitive decline. For example, simplifying the environment to feel more in control could be a good way to lower the feeling of helplessness, and thus bring about a smaller deviation in BTP and a more satisfying life.

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