



# Risky financial choices in a gain and loss decision frame – the role of chronic and situationally induced time perspectives

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## Abstract

The aim of the research was to explore the relationship between people's Time Perspectives (TPs) (chronic and induced) and their propensity to take financial risks in gambling tasks with a gain and loss decision frame. The results of the study 1 ( $N1 = 1093$ ) revealed that a higher chronic Present Hedonistic TP is related to a preference for unsure options in loss and gain frames, while a higher chronic Past Negative TP is related to a preference for sure options in a gain frame of financial choice, but for unsure options in a loss frame. Moreover, higher chronic Future TP is related to unsure option preference in a loss decision frame. The results of the study 2 ( $N2 = 563$ ) showed that the induced Past Negative TP (in a gain frame) and Present Hedonistic TP (in both decision frames) lead to similar patterns of results to those observed for the chronic TPs.

**Keywords** Chronic time perspectives · Induced time perspectives · Risk · Gambling task · Framing

## Introduction

Imagine that you have a choice between winning \$250 for sure, or taking part in a lottery with a 50% chance of winning \$500 and a 50% chance of nothing. Would you opt for a sure gain or a gamble? And if you were to lose \$250 for sure? Would you take part in a lottery with a 50% chance of not losing at all but, at the same time, risk losing \$500?

We all differ in the extent to which we are ready to accept risk, and financial risk in particular. Our preferences for taking risk are influenced, among many other individual factors, by our perception of time; namely, the Time Perspective (TP; Zimbardo and Boyd 1999, 2008). It has been shown that future-oriented and less present-oriented individuals display fewer risky behaviors, such as risky driving (Zimbardo et al. 1997), tobacco, alcohol, and illegal drug use (Keough et al. 1999), and risky health behaviors (Henson et al. 2006). However, the results of the abovementioned studies cannot be simply generalized and used

to explain risky financial decisions for at least three reasons. Firstly, the propensity to take risk is domain specific (Slovic 1972; Weber et al. 2002) and little is known about the link between one's perception of time and the propensity to take financial risk. Secondly, the existing studies on Time Perspective and risky behaviors do not take into consideration a decision frame. Meanwhile, taking this factor under account is important, as one can take risk in order to gain something (for example drive fast or use alcohol for the sake of instant pleasure) or in order to prevent losing something (for example telling a lie in an attempt to protect one's job). According to the Prospect Theory (Kahneman and Tversky 1979, 2000), people behave differently depending on the frame of the decision. Specifically, they are more sensitive to losses compared to gains. Thirdly, people may have some chronic level of TPs but various events in their lives may temporarily change them. Situational factors, not related to subsequent decisions, such as mood (Cryder et al. 2008), feeling powerful (Garbinsky et al. 2014), promotion and prevention motivation (Sekścińska et al. 2016), experience of success and failure prior to the financial decision (Sekścińska 2015) or and the level of construal (Rudzinska-Wojciechowska 2017) are shown to influence financial choices. Although personal Time Perspective is usually studied as an individual trait, Time Perspective Theory posits that it can be also situationally modified (Zimbardo and Boyd 1999). Recent studies conducted in our lab (Sekścińska et al. 2018) provide an early confirmation of this assumption. The results showed that induced TPs influence propensity to

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invest and to take financial risk. However, according to our knowledge, this was the first published attempt to induce TPs in experimental conditions and further research is needed.

Taking into account the abovementioned gaps in knowledge, in this paper, we will focus on the role of Time Perspectives, both chronic and induced, in explaining risky financial choices in a gain and a loss decision frame.

## Time Perspectives

Time perspective is a psychological construct that represents an individual's relation with time (Zimbardo and Boyd 1999). Studies on the psychology of time and temporal psychology have a long history. The concept of TP was established in its present meaning by Lewin (1942). Since then the concept has been dynamically developed in the fields of social psychology and personality by numerous researchers using various approaches and diversity of measures (see a concise history of TP research in psychological science in Stolarski et al. 2018). Initial studies on temporal perspectives focused mainly on only one dimension – the future (review in Kooij et al. 2018). The first to consider the whole spectrum of temporal perspectives was Zimbardo and Boyd's (1999, 2008) Time Perspective Theory (TPT) which is currently one of the most important theories in this area. It assumes that one's temporal frames influence decisions and behaviors in many areas of life by locating the primary set of psychological influences within the temporal frames of either the present, the past, or the future (Zimbardo et al. 1997). Zimbardo and Boyd's ideas on Time Perspective has been widely adopted and the ZTPI scale, developed to capture different aspects of the experience of time, has been translated and validated in numerous cultures, with over 20 adaptations in various languages (Sircova et al. 2014).

As a result of a number of preliminary studies, Zimbardo and Boyd (1999) distinguished five TPs: Past Negative, reflecting a negative perception of the past; Past Positive, characterized by a sentimental perception of the past; Present Hedonistic, characterized by striving toward present pleasure and enjoyment; Present Fatalistic, related to a hopeless attitude toward the future, and Future, concentrated on future goals and rewards. One's perception of time was found to be a relatively stable individual difference trait and have been associated with affective (Stolarski et al. 2014), cognitive (Zajenkowski et al. 2016), and behavioral (Harber et al. 2003) outcomes. There are also initial studies showing that personal Time Perspective can be modified by the therapeutic process (Sword et al. 2014). Moreover, according to the Time Perspective Theory, personal perception of time might be situationally (Zimbardo and Boyd 1999) and intentionally modified (Zimbardo and Boyd 2008). However, this issue was not investigated until a recent study conducted in our lab (Sekścińska et al. 2018). The results of this study showed that induced TPs lead to similar patterns of results to those obtained in studies on chronic TPs.

## Time Perspectives and Risky Financial Choices

Individual differences in TPs impact a wide range of behaviors and decisions including, among many others, those related to money management, namely, financial health (Clements 2014) and financial behaviors, such as saving and spending money (Sekścińska et al. 2017; Maison and Sekścińska 2014; Sekścińska 2014). The link between the propensity to take risk in various domains (eg. social, health) and TPs has been also confirmed in many studies (Henson et al. 2006; Keough et al. 1999; Zimbardo et al. 1997), which indicate that more future-oriented and less present-oriented individuals display fewer risky behaviors. However, to date there are only two studies that have focused on the relationships between TPs and financial risk preferences. In the study of Jochemczyk et al. (2017), the chronic Present Hedonistic TP correlated with the propensity to take risks in various domains, including betting at the horse races, at high-stake poker games and on the outcome of sporting events (scored in total as a gambling risk) and investing in stocks and new businesses (scored in total as an investment risk). At the same time, the Future TP was negatively correlated with risk-taking in various domains, except the investing and social ones. The role of TPs in investment decisions was also confirmed by Sekścińska et al. (2018). The results of the studies showed that the Higher Future TP was related to a propensity to invest and make safe investment choices, while the Higher Present Hedonistic TP was related to a low propensity to invest and a preference for risky investments. The study offered also a novel method of inducing TPs and demonstrated that situational TPs lead to similar patterns of results to those obtained in studies on chronic TPs. Nevertheless, none of the abovementioned studies took into account a decision frame. The research did not investigate financial decisions in a situation of a potential financial loss.

## Risky Financial Choices in Different Domains and Frames

Risk taking traditionally has been considered as a stable and domain-invariant individual difference trait in both personality research and behavioral decision making research (Eysenck and Eysenck 1977; Kahneman and Tversky 1979). However, individuals have often been found to show inconsistent responses to risks across domains and situations (Schoemaker 1990) and further studies provided a growing body of evidence that risk taking is domain specific (Slovic 1972; Weber et al. 2002; Hanoch et al. 2006). To better understand the interplay between risky behavior and its context, researchers have conducted studies across a variety of domains of risky decision making. For example, Weber et al. (2002) developed a domain-specific risk taking scale (DOSPERT) which is used to assess risk taking across six commonly assessed risk domains. Using the DOSPERT, Hanoch et al. (2006) demonstrated that individuals

who exhibit a high level of risk-taking behavior in one area (recreational, e.g., bungee jumpers) can exhibit moderate levels of risk-taking behavior in other domains (e.g., financial). Furthermore, Vlaev et al. (2010) demonstrated that even in one domain (e.g. financial) risk preferences might differ depending on the nature of the decision (e.g. gambling, investment, insurance). Moreover, Kusev et al. (2009) provided evidence that risky financial decisions vary as a function of the events being considered. They compared the pattern of people's risk preferences for monetary gambles and for insurance decisions and demonstrated that people's risk preferences can be risk averse for precautionary decisions about high-frequency events for almost the whole range of probability, and yet with monetary gambles in the domain of loss and for precautionary decisions involving low-frequency events people are predominantly risk seeking.

Another line of research indicates that risk preferences are influenced not only by the decision domain but also by a decision frame. Kahneman and Tversky (1979, 2000) proposed the Prospect Theory, which is a descriptive model of individual decision making. The authors showed the function of value for gains and losses and argued that this function is: (1) defined on deviations from the reference point; (2) concave for gains and convex for losses; and (3) steeper for losses than for gains. These arguments lead to the conclusion that people may behave differently depending on the frame of the decision – gains or losses. This has been confirmed in numerous research which demonstrated that people make different decisions when outcomes are described in terms of gains and when they are described in terms of losses. Specifically, they are more sensitive to losses compared to gains. They are also more risk seeking while the decision involves losses (see meta-analysis conducted by Kühberger 1998, 1999).

These abovementioned findings indicate that the propensity to take risk a complex construct that is manifested as a function of both dispositional and contextual factors. However, it would be valuable to understand whether certain personality characteristics or situational factors (such as chronic and induced Time Perspectives) influence risk behaviors invariant of domain or frame or if certain traits and situations are more predictive for specific domains and frames. In the case of Time Perspective, there is some preliminary evidence supporting the second notion and indicating that the influence of TP on the propensity to take risks in financial decisions should be further investigated. In the previously mentioned study of Jochemczyk et al. (2017), Present Hedonistic TP was correlated with the propensity to take risk regardless of the risk domain, while Future TP was negatively correlated with risk-taking propensity in numerous domains with the exception of the propensity to take investment risk. The decision frames have not been taken into account in any study linking individual Time Perspective and the propensity to take risk in various domains.

## Current Studies

Previous studies conducted in the area of the TPT indicate that individual TPs might play an important role in explaining personal risky choices in a financial domain, but there are still areas that need to be investigated. Firstly, as it was mentioned above, the studies did not take into account a decision frame. Secondly, they focused on investment risk or gambling risk related to very specific bets. Therefore, the results might not reflect the participant's attitude toward making investments and gambling, as activities such as betting at the horse races, at high-stake poker games or on the outcome of sporting events, as well as investing in new businesses, are not very popular in a country, where the study was conducted (Poland). Consequently, the lack of willingness to take part in these activities does not necessarily reflect one's attitude toward taking financial risk, but rather the lack of opportunity to do so, or a preference for other games (e.g. the National Lottery) or investments (e.g. real estate investments). A study investigating risky financial choices without a specific context is needed. We propose that a study employing a simple lottery game without a specific context might help to overcome those limitations. Finally, taking into account that a particular TP can be induced (intentionally or not) prior to a risky financial decision, it is important to check whether this kind of situational influence can impact one's choices while making risky financial decisions.

In the attempt to fill the abovementioned gaps in knowledge, two studies were conducted (one correlational and one experimental) exploring the role of chronic and situationally induced TPs in financial risky decision making, in both the gain and loss frames of choice. Based on the framework of the TPT and the results of the latest studies (Jochemczyk et al. 2017; Sekścińska et al. 2018), we elaborated a series of hypotheses concerning the potential role of individual differences in TP, as well as its situational impact, in decisions made when carrying out gambling tasks.

### Past Negative TP

Individuals scoring high on this scale are not motivated to work for future rewards and studies show that they are more keen on risky choices than those scoring high on the other TPs (Zimbardo and Boyd 1999). Therefore, we expect that both the high chronic Past Negative TP and the induced Past Negative TP will be related to people's propensity to take a risk in a gambling task, but only in the loss decision frame (H1). For the gain decision frame, the effect may be opposite (H2) as negative past experiences might discourage participants from risking a sure gain.

### Past Positive TP

Individuals with high scores on this scale are less keen to take risks than individuals with low scores (Zimbardo and Boyd

1999). Therefore, we expect that Past-Positive-oriented people and people with induced Past Positive TPs may prefer the sure over the unsure option in gambling tasks in both the gain (H3) and loss decision frames (H4).

### Present Hedonistic TP

Based on the results of Sekścińska et al. (2018) and Jochemczyk et al. (2017), we predict that high scores on the Present Hedonistic scale, as well as the activation of Present Hedonistic TP, may be related to risky option preferences in gambling tasks in both gain (H5) and loss (H6) decision frames.

### Present Fatalistic TP

Individuals scoring high on this TP tend to feel that they have little control over their life and their actions cannot result in meaningful consequences (Zimbardo and Boyd 1999). Therefore, we do not make any predictions regarding gambling decisions of individuals scoring high on this scale.

### Future TP

Taking into account the low propensity to take risk, which has been demonstrated in numerous studies cited above, a high level of a Future TP, as well as an induced Future TP, may result in a low tendency to choose risky investment options and a preference for sure over unsure options in the gain decision frame (H7), but the effect may be exactly the opposite in the loss frame (H8).

## Study 1—Time Perspectives and the Propensity to Invest and Take Financial Risks

The main goal of this study was to examine the relationship between chronic TPs and the propensity to take risks in a gambling task, in both the gain and loss decision making frames.

## Methods

### Participants

The study was conducted using a Polish national representative sample, recruited in an on-line panel. A total of 1093 people participated in the study (558 women; 535 men), aged 18–87 years ( $M = 36$ ,  $SD = 12.84$ ). The demographic structure of the sample was similar to the Polish population regarding gender, age, education and size of place of living. No participants were excluded from the analyses. The Ethics Board of University of Warsaw Faculty of Psychology approved the study.

## Measures

**Time Perspective** Time Perspectives were measured using the short version (15 questions) of the Zimbardo Time Perspective Inventory (SZTPI), created by Zhang et al. (2013). The items in the SZTPI refer to the five TPs; each TP is represented by three items. Participants were asked to answer the question: “How characteristic or true is this of me?” on a scale of 1–5 (very untrue to very true). The indicator of each TP was counted as the mean of the answers to the questions from the appropriate scale and ranged from 1 to 5. The descriptive statistics and alphas obtained for each scale are presented in Table 1. Importantly, we have conducted three other studies using SZTPI on Polish national representative samples ( $N_1, N_2, N_3 > 1000$ ) and their results yielded similar psychometric properties of this scale to those presented in the Table 1.

The short version of ZTPI was used in this study for three reasons. Firstly, in the case of research conducted via the on-line panel, the usage of brief measures yields the best response rate results. Secondly, SZTPI has been successfully used in Poland for several years and its psychometric properties are comparable to those of ZTPI. Finally, we were also advised to use the SZTPI by professor Zimbardo (personal communication, 2014).

**The Propensity to Take Financial Risks in a Gambling Task** The propensity to take financial risks in a gambling task in the gain and loss decision making frames was measured using two questions (as used in previous studies – Sekścińska et al. 2016).

In both questions (gain and loss frame), the participants were asked to choose between a sure option, PLN 1000 (equivalent to approximately \$250), and an unsure option (a 50% chance of winning/ losing PLN 0 and a 50% chance of winning/ losing PLN 2000, equivalent to approximately \$540). The questions were formulated in the same manner as the questions presented by Kahneman and Tversky (1979, 1984). We changed the amounts<sup>1</sup> used in the task, to make it more adequate for Polish reality. The expected values of both options in each question were the same (1000 PLN).

### Procedure

After completing the SZTPI questionnaire, the participants answered questions that measured their propensity to take financial risks (in both the gain and loss frames) in rotated order. Finally, sociodemographic data were collected.

<sup>1</sup> The level of the amount was established on the basis of a pilot study. Polish adults ( $n = 250$ ) were asked to assess various amounts on two scales (1) very small, small, medium, large, very large and (2) not large enough to be meaningful vs large enough to be meaningful. More than 96% of people described 1000 PLN as large enough to be meaningful, and at the same time small or very small amount.

**Table 1** The descriptive statistics and alphas for SZTPI

	Mean	SD	Skew	Kurtosis	$\alpha$	MiC
Past negative	2.95	1.07	-0.09	-0.88	.913	0.78
Past positive	3.65	0.76	-0.44	0.39	.726	0.47
Present fatalistic	3.12	0.75	-0.22	0.04	.601	0.34
Present hedonistic	2.91	0.66	-0.49	0.07	.644	0.38
Future	3.71	0.63	-0.39	0.56	.717	0.46

**Results and Discussion**

The datasets generated during and/or analysed during the current study are available from the corresponding author on request.

The descriptive statistics for the Time Perspectives are shown in Table 2. The variables for Time Perspective were mean centered before the further analyses.

A logistic regression was conducted to determine the relationship between the chronic Time Perspectives (Past Negative, Past Positive, Present Fatalistic, Present Hedonistic and Future) and the propensity to choose unsure option in a lottery in a gain frame. The results are presented in Model 1 of Table 3. There was no significant association between Past Positive or Present Fatalistic or Future TPs and unsure option preference. However, people who chose unsure option were less Past Negative and more Present Hedonistic oriented than those who chose the sure option (both  $p < .001$ ). Overall, Time Perspectives explained relatively little (4.9%) of variance in the propensity to choose risky option.

**Table 2** The descriptive statistics for time perspectives scores in a gain and loss decision frame depending on the preferred option (sure vs unsure)

	Gain frame			Loss frame		
	<i>M</i>	<i>SD</i>	95% <i>C.I.</i>	<i>M</i>	<i>SD</i>	95% <i>C.I.</i>
Past Negative						
Sure option	3.01	1.07	[2.94; 3.08]	2.81	1.02	[2.68; 2.94]
Unsure option	2.66	1.05	[2.51; 2.81]	2.99	1.07	[2.92; 3.06]
Past Positive						
Sure option	3.65	0.79	[3.60; 3.70]	3.60	0.75	[3.50; 3.70]
Unsure option	3.62	0.76	[3.51; 3.73]	3.66	0.76	[3.61; 3.71]
Present Fatalistic						
Sure option	3.13	0.74	[3.08; 3.18]	3.10	0.65	[3.02; 3.18]
Unsure option	3.03	0.79	[2.91; 3.15]	3.12	0.77	[3.07; 3.17]
Present Hedonistic						
Sure option	2.88	0.62	[2.84; 2.92]	2.80	0.62	[2.72; 2.88]
Unsure option	3.04	0.66	[2.94; 3.14]	2.94	0.66	[2.90; 2.98]
Future						
Sure option	3.72	0.62	[3.68; 3.76]	3.58	0.62	[3.50; 3.66]
Unsure option	3.67	0.60	[3.58; 3.76]	3.74	0.62	[3.70; 3.78]

Gain frame: sure option  $n = 913$ , risky option  $n = 180$ ; Loss frame: sure option  $n = 864$ , risky option  $n = 229$

Model 2 added the interaction effects between TPs and this increased the explanatory power of the model accounting for around 10% of the variance, which is still not much. The significant roles of Past Negative ( $p < .001$ ) and Present Hedonistic TP ( $p < .05$ ) were still observed after adding the interaction effects to the model. A significant positive interaction effect between Past Negative and Past Positive TPs was obtained ( $p < .05$ ). Moreover, a significant three-way interaction between Past Negative, Present Hedonistic and Future TPs was also observed ( $p < .05$ ).

Then, to check the role of the TPs (Past Negative, Past Positive, Present Fatalistic, Present Hedonistic and Future) in explaining people’s propensity to choose unsure option in a lottery in a loss frame, a logistic regression was conducted. The results are presented in Model 1 of Table 4. The significant role of Past Negative ( $p < .05$ ), Present Hedonistic ( $p < .05$ ) and Future ( $p < .001$ ) TPs was observed Altogether, the TPs explained only 3.6% of variance of people’s risky option preference. Model 2 added the interaction effects between TPs. The obtained model explained relatively little (around 6%) of variance. Similarly to the Model 1, in Model 2 the significant role of Past Negative ( $p < .05$ ), Present Hedonistic ( $p < .05$ ) and Future TPs ( $p < .001$ ) were obtained. No significant interactions effect were observed in the Model.

**Study 2 – Situationally Induced Time Perspectives and People’s Propensity to Take Financial Risks**

Study 2 aimed to check whether, and how, situationally induced TPs affect the propensity to take financial risks in a gain and loss decision frames. The study employed an experimental design.

**Methods**

**Participants**

The study was conducted using a sample of Polish adults, recruited in an on-line panel. Expecting similar effect sizes to Study 1, a power analysis using GPower 3.1.9.2 recommended a sample size of approximately 500 participants at 95% power. We over recruited as the system shuts at the end of the day when the desired sample is achieved. A total of 575 people took part in the study. 12 participants were excluded on the basis of manipulation check results, leaving a sample size of 563 for the analyses (294 women, 269 men; age 18–65 years  $M = 42$ ,  $SD = 13.82$ ).

Informed consent was obtained from all individual participants included in the study. The study was approved by the Ethics Board of University of Warsaw Faculty of Psychology.

**Table 3** Logistic regression of time perspectives and their interactions on risky option preference in a gain frame of a lottery

	Model 1				Model 2			
	B	Wald	p	OR	B	Wald	p	OR
Constant	<b>-1,70</b>	<b>382,14</b>	<b>0,00</b>	<b>0,18</b>	<b>-1,66</b>	<b>294,00</b>	<b>0,00</b>	<b>0,19</b>
Past negative TP (1)	<b>-0,34</b>	<b>16,08</b>	<b>0,00</b>	<b>0,71</b>	<b>-0,36</b>	<b>14,26</b>	<b>0,00</b>	<b>0,70</b>
Past positive TP (2)	-0,02	0,02	0,88	0,98	0,04	0,10	0,76	1,04
Present fatalistic TP (3)	-0,14	1,41	0,24	0,87	-0,08	0,29	0,59	0,92
Present hedonistic TP (4)	<b>0,50</b>	<b>13,81</b>	<b>0,00</b>	<b>1,64</b>	<b>0,40</b>	<b>6,82</b>	<b>0,01</b>	<b>1,49</b>
Future TP (5)	-0,17	1,50	0,22	0,84	-0,24	2,16	0,14	0,79
1 × 2					<b>0,25</b>	<b>3,98</b>	<b>0,04</b>	<b>1,28</b>
1 × 3					-0,24	2,67	0,10	0,79
1 × 4					-0,07	0,25	0,62	0,93
1 × 5					-0,14	0,97	0,32	0,87
2 × 3					-0,25	1,81	0,18	0,78
2 × 4					-0,03	0,02	0,89	0,97
2 × 5					-0,11	0,34	0,56	0,90
3 × 4					-0,11	0,25	0,62	0,90
3 × 5					0,05	0,06	0,81	1,05
4 × 5					0,37	2,27	0,13	1,45
1x2x3					-0,27	2,55	0,11	0,77
1x2x4					-0,04	0,04	0,84	0,96
1x2x5					0,24	2,46	0,12	1,27
1x3x4					0,30	2,04	0,15	1,35
1x3x5					0,38	3,70	0,05	1,46
1x4x5					<b>-0,49</b>	<b>6,10</b>	<b>0,01</b>	<b>0,61</b>
2x3x4					-0,28	1,12	0,29	0,76
2x3x5					-0,01	0,00	0,97	0,99
3x4x5					0,31	0,97	0,33	1,36
1x2x3x4					0,00	0,00	0,99	1,00
1x2x3x5					0,29	2,54	0,11	1,33
1x2x4x5					0,28	1,36	0,24	1,32
1x3x4x5					-0,23	0,76	0,38	0,79
2x3x4x5					-0,25	0,74	0,39	0,78
1x2x3x4x5					0,06	0,12	0,73	1,06
Nagelkerke pseudo r-square	4.9%				9.7%			
Chi-square	31.90; df = 5; p < .001				64.64; df = 30; p < .001			

Statistically significant factors in the model are bolded

## Materials

**TP Activation** Situational TPs were activated using five sets of six sentences that the participants were asked to read (see: Sekścińska et al. 2018).<sup>2</sup> The sentences were created based on the Zimbardo Time Perspective Inventory items (Zimbardo and Boyd 1999). There were five versions of sets of sentences. Each version referred to the definition of a particular TP (e.g. Future: People believe that meeting deadlines and performing the necessary actions takes primacy over current entertainment, etc.). After reading each set of sentences, the participants were asked to rewrite two of them to enhance the effect of manipulation. As

<sup>2</sup> The sentences used to activate time perspectives were chosen based on the results of the pilot study ( $n = 115$ ). The participants were randomly assigned to one of five experimental conditions in which the past negative, past positive, present hedonistic, present fatalistic and future TP was induced. Participants read two sets of three sentences each and then they were asked to recall the sentences they had just read and write the first three associations that came into their minds. We expected that the associations would be related to the TP that was supposed to be activated. We marked all responses where all three associations were related to the TP or where two associations were related and the third was neutral in terms of TP but linked with the words in the read sentences (e.g., people) as correct and counted them. One hundred and thirteen participants' associations were consistent with our assumptions, therefore we decided to use the experimental material in the main study in an unchanged form.

a manipulation check, participants were asked to write three associations that came to their minds after reading the sentences. The results of the manipulation check showed that 96–99% (depending on the TPs) of the participants wrote words consistent with the TP that was supposed to be activated. The other participants (in total 12 people) refused to answer the question or answered using neutral (eg. people, life, psychology) or ambiguous words (eg. mother, dinner, honey, chestnut – as an answer after Past Positive TP activation).

**Propensity to Take Financial Risks in a Gambling Task** The propensity to take financial risks in a gambling task in the gain and loss decision making frames was measured in the same way as in the Study 1.

## Procedure and Design of the Study

After a particular TP was activated, participants completed the measures of financial risks preferences in a random order. Finally, they were fully debriefed.

The induced TPs was the between-subjects independent variable (manipulation). The propensity to take financial risks in the gain decision making frame and the propensity to take financial risks in the loss decision making frame were the first and second

**Table 4** Logistic regression of time perspectives and their interactions on risky option preference in a loss frame of a lottery

	Model 1				Model 2			
	B	Wald	p	OR	B	Wald	p	OR
Constant	<b>1,37</b>	<b>316,36</b>	<b>0,00</b>	<b>3,92</b>	<b>1,38</b>	<b>254,87</b>	<b>0,00</b>	<b>3,98</b>
Past negative TP (1)	<b>0,17</b>	<b>4,78</b>	<b>0,03</b>	<b>1,18</b>	<b>0,18</b>	<b>4,65</b>	<b>0,03</b>	<b>1,20</b>
Past positive TP (2)	-0,05	0,20	0,66	0,95	-0,01	0,00	0,96	0,99
Present fatalistic TP (3)	-0,09	0,67	0,41	0,91	-0,13	1,02	0,31	0,88
Present hedonistic TP (4)	<b>0,33</b>	<b>7,36</b>	<b>0,01</b>	<b>1,39</b>	<b>0,33</b>	<b>6,32</b>	<b>0,01</b>	<b>1,39</b>
Future TP (5)	<b>0,45</b>	<b>13,10</b>	<b>0,00</b>	<b>1,57</b>	<b>0,52</b>	<b>13,00</b>	<b>0,00</b>	<b>1,69</b>
1 × 2					0,13	1,49	0,22	1,14
1 × 3					0,08	0,42	0,52	1,08
1 × 4					0,06	0,27	0,60	1,06
1 × 5					-0,14	1,23	0,27	0,87
2 × 3					0,09	0,29	0,59	1,09
2 × 4					0,18	1,17	0,28	1,20
2 × 5					-0,14	0,62	0,43	0,87
3 × 4					-0,35	3,63	0,06	0,70
3 × 5					-0,01	0,00	0,96	0,99
4 × 5					0,21	0,91	0,34	1,23
1x2x3					-0,04	0,10	0,76	0,96
1x2x4					0,08	0,32	0,57	1,08
1x2x5					-0,11	0,73	0,39	0,90
1x3x4					0,16	0,92	0,34	1,18
1x3x5					0,04	0,07	0,80	1,04
1x4x5					-0,11	0,43	0,51	0,89
2x3x4					-0,02	0,01	0,92	0,98
2x3x5					0,03	0,02	0,88	1,03
3x4x5					0,23	0,72	0,40	1,26
1x2x3x4					0,04	0,04	0,84	1,04
1x2x3x5					-0,08	0,27	0,60	0,92
1x2x4x5					-0,05	0,09	0,76	0,95
1x3x4x5					-0,01	0,00	0,96	0,99
2x3x4x5					0,23	1,01	0,32	1,26
1x2x3x4x5					-0,10	0,30	0,59	0,90
Nagelkerke pseudo r-square	3.6%				6.1%			
Chi-square	25.51; df= 5; p < .001				43.93; df= 30; p < .05			

Statistically significant factors in the model are bolded

dependent variables. The indicator of the propensity to take financial risk in each of the frames was the preference for the unsure option over the sure one.

**Results and Discussion**

To verify the differences in situationally induced TPs between participants who chose a sure or unsure option in a gambling task, two  $\chi^2$  analyses were conducted (for the gain and loss frames). In the gain frame, the  $\chi^2$  test showed a significant, although weak effect ( $\chi^2(4) = 15.49, p = .004$ , Cramer’s  $V = 0.166$ , 95% C.I. [0.0838; 0.2457], statistical power: 0.9023, Table 5). The participants from the Present Hedonistic group chose the unsure option significantly more often than was theoretically expected ( $|standardized\ residual| > 1.96$ , Table 5), while the participants from the Past Negative TP group chose the unsure option less often than was expected ( $|standardized\ residual| > 1.96$ , Table 5).

In the loss frame, the  $\chi^2$  test showed a significant, although weak effect ( $\chi^2(4) = 16.21, p = .003$ , Cramer’s  $V = 0.17$ , 95% C.I. [0.0877; 0.2494], statistical power: 0.9168, Table 5). The sure option was chosen more often than expected by participants from the Present Fatalistic TP group ( $|standardized\ residual| > 1.96$ , Table 4), and less often than expected by those

in the Present Hedonistic TP group ( $|standardized\ residual| > 1.96$ , Table 5).

Study 2 aimed to verify the role of situationally induced TPs in people’s financial risk preferences in gain and loss decision frames. The results showed that in the gain decision frame, the induced Present Hedonistic TP was related to a preference for the unsure (risky) option, while participants in the situational Past Negative TP group preferred the sure option. In the loss frame, people from the Present Fatalistic TP group preferred the sure option over the unsure one, while participants with the induced Present Hedonistic TP chose sure option less frequently than it was expected.

**General Discussion**

The goal of the research was to investigate the relationship between TPs and risky financial choices in gambling tasks with a gain and loss decision frame. In order to explore this issue, two studies were conducted (correlational and experimental). The TPs were treated either as chronic individual characteristics or were experimentally induced.

The results of the conducted studies show that there are two crucial TPs that influence risky financial choices, namely

**Table 5** Sure vs unsure option preference between situationally induced TP groups in gain and loss decision frames

	Sure option			Unsure option		
	OC (%) <sup>*</sup>	EC (%) <sup>*</sup>	SR <sup>*</sup>	OC (%) <sup>*</sup>	EC (%) <sup>*</sup>	SR <sup>*</sup>
Gain frame of decision making						
Past negative TP	96 (92%)	87.6 (84%)	0.9	8 (8%)	16.4 (16%)	-2.1
Past positive TP	100 (85%)	98.5 (84%)	0.2	17 (15%)	18.5 (16%)	-0.3
Present fatalistic TP	89 (88%)	85 (84%)	0.4	12 (12%)	16 (16%)	-1.0
Present hedonistic TP	101(75%)	113.7 (84%)	-1.2	34 (25%)	21.3 (16%)	2.7
Future TP	88 (83%)	89.2 (84%)	-0.1	18 (17%)	16.8 (16%)	0.3
Loss frame of decision making						
Past negative TP	28 (27%)	29.4 (28%)	-0.3	76 (73%)	74.6 (72%)	0.2
Past positive TP	39 (33%)	33 (28%)	1.0	78 (67%)	72.5 (72%)	-0.7
Present fatalistic TP	41 (41%)	28.5 (28%)	2.3	60 (59%)	72.5 (72%)	-1.5
Present hedonistic TP	25 (19%)	38.1 (28%)	-2.1	110 (81%)	96.9 (72%)	1.3
Future TP	26 (25%)	29.9 (28%)	-0.7	80 (75%)	76.1 (72%)	0.5

<sup>\*</sup>OC, observed counts; EC, expected counts; SR, standardized residual

Present Hedonistic and Past Negative. They also confirm that the decision frame is an important factor while analyzing risk preferences. In a gain frame, people with a higher level of Present Hedonistic TP preferred the risky option over the safe one. It is worth noting that analogical results were obtained when the Present Hedonistic TP was induced. The abovementioned results support H5. Moreover, in a loss decision frame, higher levels of Present Hedonistic TP were related also to the preference for the unsure option and the effect of activation of the Present Hedonistic was analogical (in line with H6). The results are consistent with previous research, indicating that a high score in the Present Hedonistic TP scale is related to risk-taking (Jochemczyk et al. 2017; Sekścińska et al. 2018). However, this relationship has not been investigated before in the context of decision frames.

In the present study, Past Negative TP (chronic and induced) was related to a preference for the sure option (supporting H1) in the gain decision frame. At the same time, the chronic Past Negative TP was related to a preference for the unsure option in a loss frame (in line with H2). At the same time, the role of an induced Present Fatalistic TP was observed only in the loss frame and resulted in preference for the sure over the unsure option. It has to be noted that the Past Negative and Present and Fatalistic Time Perspectives are not often indicated as important factors explaining risky decisions. Previous studies, linking TPs with risky-driving (Zimbardo et al. 1997), substance usage (Keough et al. 1999) or general propensity to take risk (Jochemczyk et al. 2017) did not show the link between the propensity to take risk and scores on Past Negative or Present Fatalistic scales. However, Zimbardo and Boyd's (1999) analysis of case studies showed that those high on Past Negative had more positive feelings toward gambling than did those in other TP groups. The results obtained in our studies are therefore valuable, as they broaden our understanding of financial

behavior of individuals who focus on their negatively perceived past or look hopelessly at the future. They also add to the results obtained by Sekścińska et al. (2018) who observed that people scoring low on Past Negative TP and Present Fatalistic preferred investing money over saving them and saving money over current consumption.

The results of the studies presented in this manuscript also demonstrate that chronic Future TP seems to only be important in loss frame tasks, where higher levels of Future TP were related to unsure option preferences (supporting H8). The induction of a Future TP had no effects on risk preferences. This is also in line with the results of previous studies which demonstrated that Future TP was a significant negative predictor of risky behaviors, but this relation was usually much weaker than the one observed for Present Hedonistic TP (Keough et al. 1999; Zimbardo et al. 1997). This might explain why the results concerning Future TP are less consistent than we expected.

The results of the present studies conceptually replicate and thus confirm the effects obtained by Sekścińska et al. (2018) suggesting that individual Time Perspectives understood both as a chronic trait and situationally induced state impact risky financial choices. This opens some new directions for possible future studies. Firstly, although it is believed (Zimbardo and Boyd 2008) that TP should be considered both as a state and as a trait, researchers often assume that TP is what the ZTPI measures and limit their studies to investigating correlations between the scale and constructs of their interest (see Stolarski et al. 2018 for a detailed discussion). As a result, experimental studies on the effects of situationally induced TPs on various aspects of decisions and behaviors were lacking. We believe that our first attempts to experimentally induce TPs will inspire other researchers to conduct this kind of studies. Moreover, we believe that new methods of experimental TPs activation will be demonstrated soon. Secondly, the idea that a



given TP might be induced by situational factors leads to questions about the joint influence of chronic and situational Time Perspectives and their potential interaction on subsequent decisions. There is a small albeit growing body of research indicating that individual's chronic traits can interact with situational activation of corresponding states (Jain et al. 2007; Haws et al. 2012).

The work offers novel implications, both theoretical and practical. It contributes to the literature in several ways. First, it adds to previous findings on risk taking by confirming that a decision frame should be taken into consideration while analyzing the influence of Time Perspectives on the propensity to take risk. Secondly, it contributes to the vast literature on financial decision-making by confirming that gambling decisions are influenced not only by objective financial data, but also psychological factors, and Time Perspectives in particular. Just as important are practical contributions of the studies. Taking into account how important it is to promote reasonable financial behaviors, the results might help to understand the mechanisms standing behind overconsumption and investment choices. Moreover, determining who is more likely to take an unnecessary risk and in what domains, allows for better understanding of these propensities. Perhaps revealing such biases to the interested decision-makers might enable them to make wiser and more rewarding financial decisions. Being aware that our personal attitude toward time can affect our risky decisions and that we are susceptible to suggestions and other situational factors that can alter our Time perspective and thus influence our choices, might make consumers more sensitive and more cautious while making decisions that involve taking risk. Therefore it might be possible to help consumers make responsible, safe and future-oriented financial decisions. Thus the results might be of interest to all institutions (e.g. banks, financial counsellors) that aim at understanding consumer financial decisions and seek to increase responsible management of household money.

Although the obtained results seem promising, the findings and methods are not without their limitations. We relied solely on self-reported data and gambling decisions were based on participants' declarations of their intentions. As a consequence, we obtained only quasi-behavioral data and have no information on the actual financial decisions made by the participants in the context of gambling. While the use of real financial choices seems desirable for obvious reasons, it is hard to imagine a research grant enabling researchers to provide participants with incentives high enough to be perceived as meaningful. What's more, studies show that the results of experiments with hypothetical rewards validly apply in everyday life (Kühberger et al. 2002; Johnson and Bickel 2002; Locey et al. 2011). On the other hand, it has to be noted that there are some studies that have overcome those difficulties and managed to gather information about factors

linked to the propensity to take risk in real-life situations. For example, Coates & Herbert (2008) conducted research among male traders in the City of London. They investigated the role of the endocrine system in financial risk taking and found, among other results, that trader's morning testosterone level predicted his day's profitability. Similarly, Coates et al. (2009) found that the relatively long fourth finger (a marker for higher prenatal androgens) increases risk preferences.

Another concern is that the effects obtained in the studies, although significant, are rather weak. This is not surprising taking into account that we have investigated the role of psychological variables in such complex decisions as those concerning money. The observed effect sizes for TPs are comparable to effects obtained in other studies focusing on the role of psychological variables in financial decisions (for example Big Five and TP in Jochemczyk et al. 2017; Narcissism in Foster et al. 2011; NEOAC in Xiao et al. 2009). Single psychological variables are rarely strong predictors for choices concerning money.

Furthermore, we have to acknowledge the studies that have raised concerns about the reliability and validity of ZTPI scores and its shorter versions (e.g. McKay et al. 2014). At the same time, the ZTPI has been widely adopted as a new standard measure, and is now one of the few powerfully validated scales at the global level that capture different aspects of the experience of time. We are aware that the alpha coefficients obtained in case of two subscales of SZTPI in our study are less than satisfactory, but it is a problem that is often shared by brief measures (see Gosling et al. 2003). However, it would be worthwhile to replicate the results of the presented studies using the full version of ZTPI.

Concluding, the present studies revealed that the TPs play an important role in people's risky financial choices. It is worth emphasizing that both chronic and situationally induced TPs may influence the propensity to take risk in both gain and loss frames, but the role of a particular TP is not the same for both decision frames.

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## Compliance with Ethical Standards

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Conflict of Interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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## References

- Clements, N. P. (2014) Finances and time perspective. Paper presented at the 2<sup>nd</sup> international conference on time perspective, Warsaw, Poland, 29th July – 1st august, 2014.
- Coates, J. M., & Herbert, J. (2008). Endogenous steroids and financial risk taking on a London trading floor. *Proceedings of the national academy of sciences*, 105(16), 6167–6172.
- Coates, J. M., Gurnell, M., & Rustichini, A. (2009). Second-to-fourth digit ratio predicts success among high-frequency financial traders. *Proceedings of the National Academy of Sciences*, pnas-0810907106.
- Cryder, C. E., Lerner, J. S., Gross, J. J., & Dahl, R. E. (2008). Misery is not miserly: Sad and self-focused individuals spend more. *Psychological Science*, 19(6), 525–530. <https://doi.org/10.1111/j.1467-9280.2008.02118.x>.
- Eysenck, S. B., & Eysenck, H. J. (1977). The place of impulsiveness in a dimensional system of personality description. *British Journal of Social & Clinical Psychology*, 16, 57–68.
- Foster, J. D., Reidy, D. E., Misra, T. A., & Goff, J. S. (2011). Narcissism and stock market investing: Correlates and consequences of cocksure investing. *Personality and Individual Differences*, 50(6), 816–821.
- Garbinsky, E. N., Klesse, A. K., & Aaker, J. (2014). Money in the bank: Feeling powerful increases saving. *Journal of Consumer Research*, 41(3), 610–623.
- Gosling, S. D., Rentfrow, P. J., & Swann Jr., W. B. (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality*, 37(6), 504–528.
- Hanoch, Y., Johnson, J. G., & Wilke, A. (2006). Domain specificity in experimental measures and participant recruitment. *Psychological Science*, 17, 300–304.
- Harber, K. D., Zimbardo, P. G., & Boyd, J. N. (2003). Participant self-selection biases as a function of individual differences in time perspective. *Basic and Applied Social Psychology*, 25(3), 255–264.
- Haws, K. L., Bearden, W. O., & Dholakia, U. M. (2012). Situational and trait interactions among goal orientations. *Marketing Letters*, 23, 47–60. <https://doi.org/10.1007/s11002-011-9134-5>.
- Henson, J. M., Carey, M. P., Carey, K. B., & Maisto, S. A. (2006). Associations among health behaviors and time perspective in young adults: Model testing with bootstrapping replication. *Journal of Behavioral Medicine*, 29(2), 127–137. <https://doi.org/10.1007/s10865-005-9027-2>.
- Jain, S. P., Desai, K. K., & Mao, H. (2007). The influence of chronic and situational self-construal on categorization. *Journal of Consumer Research*, 34, 66–76. <https://doi.org/10.1086/513047>.
- Jochemczyk, Ł., Pietrzak, J., Buczkowski, R., Stolarski, M., & Markiewicz, Ł. (2017). You only live once: Present-hedonistic time perspective predicts risk propensity. *Personality and Individual Differences*, 115, 148–153. <https://doi.org/10.1016/j.paid.2016.03.010>.
- Johnson, M. W., & Bickel, W. K. (2002). Within-subject comparison of real and hypothetical money rewards in delay discounting. *Journal of the Experimental Analysis of Behavior*, 77(2), 129–146.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263–292.
- Kahneman, D., & Tversky, A. (1984). Choices, values and frames. *American Psychologist*, 39(4), 341–350.
- Kahneman, D., & Tversky, A. (Eds.). (2000). *Choices, Values and Frames*. New York, NY: Cambridge University Press; Russell Sage Foundation.
- Keough, K. A., Zimbardo, P. G., & Boyd, J. N. (1999). Who's smoking, drinking, and using drugs? Time perspective as a predictor of substance use. *Basic & Applied Social Psychology*, 21(2), 149–164.
- Kooij, D. T. A. M., Kanfer, R., Betts, M., & Rudolph, C. W. (2018). Future Time Perspective: A Systematic Review and Meta-Analysis. *Journal of Applied Psychology*. Advance online publication. <https://doi.org/10.1037/apl0000306>
- Kühberger, A. (1998). The influence of framing on risky decisions: A meta-analysis. *Organizational Behavior and Human Decision Processes*, 75(1), 23–55.
- Kühberger, A., Schulte-Mecklenbeck, M., & Perner, J. (1999). The effects of framing, reflection, probability, and payoff on risk preference in choice tasks. *Organizational Behavior and Human Decision Processes*, 78(3), 204–231.
- Kühberger, A., Schulte-Mecklenbeck, M., & Perner, J. (2002). Framing decisions: Hypothetical and real. *Organizational Behavior and Human Decision Processes*, 89(2), 1162–1175.
- Kusev, P., van Schaik, P., Ayton, P., Dent, J., & Chater, N. (2009). Exaggerated risk: Prospect theory and probability weighting in risky choice. *Journal of Experimental Psychology*, 35, 1487–1505. <https://doi.org/10.1037/a0017039>.
- Lewin, K. (1942). Time perspective and morale. In G. Watson (Ed.), *Civilian morale* (pp. 48–70). Boston, MA: Houghton Mifflin.
- Locey, M. L., Jones, B. A., & Rachlin, H. (2011). Real and hypothetical rewards. *Judgment and Decision making*, 6(6), 552–564.
- Maison, D., & Sekścińska, K. (2014). Time perspective as a determinant of financial behaviors. In *Paper presented at the 2<sup>nd</sup> international conference on time perspective, Warsaw, Poland, 29th July – 1st august* (p. 2014).
- McKay, M. T., Worrell, F. C., Temple, E. C., Perry, J., & Cole, J. C. (2014). A critical examination of the reliability and validity of the SZTPI-15 in British, American and Australian samples. *Personality and Individual Differences*, 69, 168–172.
- Rudzinska-Wojciechowska, J. (2017). If you want to save, focus on the forest rather than on trees. The effects of shifts in levels of construal on saving decisions. *PLoS One*, 12(5), e0178283.
- Schoemaker, P. J. H. (1990). Are risk-attitudes related across domains and response modes? *Management Science*, 36, 1451–1463.
- Sekścińska, K. (2014). The impact of time perspective on financial decision depending on the experience of success and failure”, paper presented at the 2<sup>nd</sup> international conference on time perspective, Warsaw, Poland, 29th July – 1st august, 2014.
- Sekścińska, K. (2015). People's financial choice depends on their previous task success or failure. *Frontiers in Psychology*, 6, 1730. <https://doi.org/10.3389/fpsyg.2015.01730>.
- Sekścińska, K., Maison, D. A., & Trzcńska, A. (2016). How People's motivational system and situational motivation influence their risky financial choices. *Frontiers in Psychology*, 7, 1360.
- Sekścińska, K., Goszczyńska, M., & Maison, D. (2017). Rola perspektywy czasowej w działaniach ekonomicznych – Perspektywa psychologiczna (the role of temporal perspective in economical activity – Psychological perspective). *Psychologia Wychowawcza*, 54(12), 63–84.
- Sekścińska, K., Rudzinska-Wojciechowska, J., Maison, D. (2018) Individual differences in time perspectives and risky financial choices. *Personality and Individual Differences*, 120c, 118–126.
- Sirocova, A., van de Vijver, F. J. R., Osin, E., Milfont, T. L., Fieulaine, N., Kislali-Erginbilgic, A., Zimbardo, P. G., & 54 members of the International Time Perspective Research Project. (2014). A global

- look at time: A 24-country study of the equivalence of the Zimbardo time perspective inventory. *SageOpen*, 4, 1.
- Slovic, P. (1972). Psychological study of human judgment: Implications for investment decision making. *The Journal of Finance*, 27(4), 779–799. <https://doi.org/10.1111/j.1540-6261.1972.tb01311.x>.
- Stolarski, M., Matthews, G., Postek, S., Zimbardo, P., & Bitner, J. (2014). How we feel is a matter of time: Relationships between time perspectives and mood. *Journal of Happiness Studies*, 15(4), 809–827.
- Stolarski, M., Fieulaine, N., & Zimbardo, P. G. (2018). Putting time in a wider perspective: The past, the present, and the future of time perspective theory. In V. Zeigler-Hill & Todd Shackelford (eds.), *The SAGE Handbook of Personality and Individual Differences* (pp. 592–628). Thousand Oakes, CA: SAGE.
- Sword, R. M., Sword, R. K. M., Brunskill, S. R., & Zimbardo, P. G. (2014). Time perspective therapy: A new time-based metaphor therapy for PTSD. *Journal of Loss and Trauma*, 19(3), 197–201. <https://doi.org/10.1080/15325024.2013.763632>.
- Vlaev, I., Kusev, P., Stewart, N., Aldrovandi, S., & Chater, N. (2010). Domain effects and financial risk attitudes. *Risk Analysis*, 30(9), 1374–1386.
- Weber, E. U., Blais, A.-R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making*, 15(4), 263–290. <https://doi.org/10.1002/bdm.414>.
- Xiao, Z., Wang, D., & Liu, Y. (2009). Economic environment and personality: How do they influence investment decisions and regret? *Social Behavior and Personality: An International Journal*, 37(10), 1297–1304.
- Zajenkowski, M., Stolarski, M., Witowska, J., Maciantowicz, O., & Łowicki, P. (2016). Fluid intelligence as a mediator of the relationship between executive control and balanced time perspective. *Frontiers in Psychology*, 7, 1844. <https://doi.org/10.3389/fpsyg.2016.01844>.
- Zhang, J. W., Howell, R. T., & Bowerman, T. (2013). Validating a brief measure of the Zimbardo time perspective inventory. *Time & Society*, 22(3), 391–409.
- Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology*, 77(6), 1271–1288.
- Zimbardo, P. and Boyd, J. (2008). *The time paradox: The new psychology of time that will change your life*. Simon and Schuster.
- Zimbardo, P. G., Keough, K. A., & Boyd, J. N. (1997). Present time perspective as a predictor of risky driving. *Personality and Individual Differences*, 23(6), 1007–1023.