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Time Perspectives and Online Behavior of Digital Natives at the Tertiary Education Level

Abstract: The time perspective has been the subject of various studies aimed at understanding human behavior. Our goal was to extend the growing literature in this field by studying the role of time perspectives in shaping online behavior among digital natives. 569 digital natives at the tertiary education level completed self-report forms assessing two major processes: time perspectives and online behavior. Adverse time-perspective biases were found to be related to rude, harsh, and distrustful online behavior. Present-oriented people displayed a high amount of online activity, while future-oriented ones showed a more functional approach to Internet use. Past-positive and past-negative orientations occurred concomitantly with different levels of affability online. We discuss the findings and their limitations, along with suggestions for future research in this field. As it is possible to modify time perspectives, this study may contribute to the development of methods aimed at preventing undesirable online behavior and improving individuals' well-being.

Keywords: Time perspectives, online behavior, social media usage, personality, digital natives

Introduction

Time is an integral part of human existence and has been at the core of theoretical and applied debates in various sciences (Molinari et al. 2016). Although time is objective, its perception is subjective and unique to each individual (Zimbardo & Boyd 2008). This exceptional notion of time is something individuals experience and manipulate in everyday life. Time perception influences human behavior and affects a person's identity (D'Alessio et al. 2003).

Previous studies examining the concept of time have contributed to understanding its role in human life not only as a tool for assessing well-being, health and productivity (Precin 2017), social relationships (Holman & Zimbardo 2009), and lifespan (Chen et al. 2016), but also as an important predictor of pathological and risky behavior (D'Alessio et al. 2003). Therefore, the time perspective is a pivotal cognitive process influencing individuals' perception, interpretation, and negotiation of their physical and social worlds (Holman & Zimbardo 2009). While some studies have been conducted on the relationship between the notion of time and virtual reality, this area remains relatively unexplored (Przepiorka & Blachnio 2016). Our study seeks to expand the literature by investigating the relation be-

tween time perspectives and the online behavior of digital natives at the tertiary education level. In short, digital natives are today's young people, born and bred in the digital era (Gkioulos et al. 2017b). The term originated in 2001 when Prensky claimed that this new generation is different from previous ones because of technological advancements (Prensky 2001, 2010). The generation gap has led to a large discontinuity, as the digital natives' way of thinking and behaving has been shaped by being exposed to technology almost since the moment of birth (Gkioulos et al. 2017a; Grigoryan 2018). As the debate on the habits of digital natives continues (Bennett et al. 2008; Bennett & Maton 2010; Lai & Hong 2015; Palfrey & Gasser 2016), further studies would seem desirable.

The Time Perspective

This paper defines the time perspective—an individual's formation of psychological time—as a pivotal socio-cognitive variable. The time perspective involves multi-dimensional, cognitive processes and is a zone where personal experiences and their perceptions are parsed into past, present, and future temporal frames (Sword et al. 2013; Worrell et al. 2016; Precin 2017). The development of time perspectives requires cognitive skills and a sense of connectedness among events across time dimensions (Molinari et al. 2016). It is based on the capacity for long-term planning, the recognition of future outcomes, and interim decision-making skills (Ferrari et al. 2010). The time perspective affects individuals' functioning and forms the context they use to modify their thoughts, behavior, and feelings, and to understand life experiences (Holman & Zimbardo 2009). Its influence on human behavior is pervasive and powerful, albeit to a great extent unrecognized (Zimbardo & Boyd 1999; Chen et al. 2016).

The time perspective, seen as a person's concentration on particular dimensions of time, may be divided into five basic categories: past positive, past negative, present hedonistic, present fatalistic, and future (Zimbardo et al. 1997). People formulate their goals (Emmons 1992), expectations, memories, self-perceptions, images of others and the world (Przepiorka & Blachnio 2016), life purposes (Cantor & Zirkel 1990), and the creation of possible selves (Markus & Cross 1990) in accordance with their perspective. Assigning personal and social experiences to specific temporal categories is often an unconscious process. It comprises reminiscences and perceptions of past events, anticipation of future ones, and instantaneous emotional experiences (Stolarski et al. 2014). Still, it might be purposely modified through intentional individual endeavors and professional psychological interventions (van Beek et al. 2009; Zimbardo et al. 2012).

Time perspectives are not a constant. All individuals possess a blend of their own time perspectives, which can be modified, either consciously or unconsciously. According to the socio-emotional selectivity theory, people are more willing to become less future-oriented and concentrate more on present needs when a significant ending is near (death, departure, graduation, etc.) (Carstensen et al. 1999). It is best for an individual to develop a balanced mix of time perspectives which can be adapted to changing life conditions and individual needs. The optimal blend should comprise a high past positive, moderately high future, fair present hedonistic, and reduced past negative and present fatalism (Sword et al. 2013). The

time perspective blend affects individuals' choices throughout their entire life. It is crucial in both adolescence and later youth (Molinari et al. 2016).

Each time perspective has different characteristics. The past negative encompasses a pessimistic, aversive focus on the past. It involves both unpleasant past experiences and an unfavorable reconstruction of them. Individuals with a bias toward this perspective exhibit not only pessimistic views of a traumatic past but also of neutral occurrences. They express loneliness, poor self-esteem, emotional instability, a tendency toward depression, anxiety, sadness, poor impulse control, having few friends, unhappiness, a lack of pleasure in the activities of life, inattention to future consequences, and poor motivation (Zimbardo & Boyd 1999; Precin 2017). A past negative orientation is positively correlated with mental health problems (Laghi et al. 2009) and predicts pessimistic moods more strongly than other time perspectives (Stolarski et al. 2014). A past positive perspective is a warm, embracing, glowing, and appreciative attitude (Chen et al. 2016). It is usually sentimental, with an attachment to values such as family, tradition, and rituals (Stolarski et al. 2014). Past-positive-oriented people are usually optimistic and resilient, and feel a high sense of security and well-being (Precin 2017). Present hedonism denotes self-indulgence, a desire for spontaneous pleasure, impulsiveness, excitement, and risk-taking, along with little regard for possible consequences (Keough et al. 1999; D'Alessio et al. 2003). Among the behavior typical for this perspective are enjoying a good time, consuming unhealthy food, practicing unsafe sex, a tendency toward substance abuse, and being adventurous (Precin 2017). People with this orientation are also more social; they are good companions, supportive, and less avoiding of conflicts (Holman & Zimbardo 2009). Present fatalism is distinguished by a pessimistic, bleak, and powerless approach to life, with an inclination toward fatalism, filled with hopelessness, helplessness, and a tendency to offer low support and maintain a high level of conflict (Zimbardo & Boyd 1999). This perspective is related to an external locus of control, whereby individuals feel little control over their own life. The future perspective is highly goal-oriented, focusing on planning and on consideration of possible consequences and rewards for actions. A typical behavior is delayed gratification, which is the ability to postpone immediate pleasure in favor of future benefits. This perspective is also characterized by well-being, wealth, long-term thinking, goal-achieving, conscientiousness, advanced education, and a reluctance to take risks (Boniwell et al. 2010). According to construal level theory, future-oriented individuals possess a large, diverse social network due to their goal-oriented, expansive, superordinate global thinking (Trope & Liberman 2003).

Previous Studies

The concomitance of time perspectives and personality traits has been widely researched. The concept of a time span was introduced in 1939 (Frank 1939), but it was Lewin (1951) who emphasized the impact of the time perspective on psychological conditions. Later, Zimbardo and his colleagues conducted a series of studies on the time perspective and designed the Zimbardo Time Perspective Inventory (ZTPI) (Zimbardo et al. 1997; Zimbardo & Boyd 1999; Zimbardo & Boyd 2008; Zimbardo et al. 2012).

It has been proven that time perspectives are correlated with cognition, emotion, and connectedness (Molinari et al. 2016). They are also related to the recall and anticipation of moods (Stolarski et al. 2014), mindfulness (Drake et al. 2008; Seema & Sircova 2013), delayed gratification (Wu & He 2012), emotional intelligence (Stolarski et al. 2011), life satisfaction (Sailer et al. 2014), health behavior (Crockett et al. 2009), and well-being (Boniwell et al. 2010; Zhang et al. 2013a). Zimbardo (1990) asserts that time perspectives may be used for developing strategies aimed at doing away with pathological behavior. Various studies confirm the relation between time perspectives and deleterious behavior and negative features, including: substance abuse (Keough et al. 1999; Wills et al. 2001; Apostolidis et al. 2006; Fieulaine & Martinez 2010; McKay et al. 2014; Chavarria et al. 2015); risky driving (Zimbardo et al. 1997); HIV risk (Rothspan & Read 1996); poverty (Epel et al. 1999; Boniwell & Zimbardo 2003); anxiety and depression (Anagnostopoulos & Griva 2012); gambling (Hodgins & Engel 2002; MacKillop et al. 2006; Sharif-Razi et al. 2012); obesity (Guthrie et al. 2014); and suicide (Laghi et al. 2009).

Studies conducted on young people have proven the relation between time perspectives and, *inter alia*, grade-point averages (Precin 2017), academic achievement (Zimbardo & Boyd 1999; Boyd & Zimbardo 2005; Horstmanshof & Zimitat 2007; Adelabu 2007; Mello & Worrell 2006), decision-making, relational styles, and engagement (Walker & Tracey 2012; Molinari et al. 2016), interventions for at-risk students (Ferrari et al. 2012), building a larger social network of long-lasting relationships (Holman & Zimbardo 2009), and neuroticism, extraversion, and conscientiousness (Zhang & Howell 2011).

Some scholars have examined the relationship between time perspectives and Internet addiction and Facebook intrusion (Park et al. 2011; Przepiorka & Blachnio 2016), abuse on social networking sites (SNS) (Chittaro & Vianello 2013), engaging in popular online multi-player role-playing games (Lukavska 2012), and online procrastination (Kim et al. 2017, Zabelina et al. 2018). Still, this area is not well examined, especially in regard to digital natives.

Based on the current state of the literature (presented above), the following research question is proposed: Do digital natives at the tertiary education level evince different online behavior due to possessing various time-perspective biases? The set of online behavior included in our survey will be more extensive than those examined hitherto. Using the theoretical framework of Zimbardo and Boyd (1999), as well as building on the results of previous studies demonstrating the link between time perspectives and online behavior (Zimbardo & Boyd 1999; Stolarski et al. 2014; Precin 2017; Kim et al. 2017; Zabelina et al. 2018; Kooij et al. 2018) we formulated the following hypotheses:

H1. Past-negative- and present-fatalistic-oriented people are more likely to evince rude, harsh, and distrustful online behavior than other time-perspective groups;

H2. Present-oriented people show a tendency to achieve a higher level of online activity than people evincing adverse time-perspective biases;

H3. Past-positive-oriented people are more likely to be affable online than negative-oriented people;

H4. A dominating future time perspective occurs concomitantly with a functional approach to Internet use more often than with other time-perspective groups.

The first prediction is based on previous studies (Zimbardo & Boyd 1999; Precin 2017) which demonstrated that these two time perspectives are related to emotional instability, poor impulse control, unhappiness, carelessness about future consequences, a conflict orientation, and cantankerousness. We expect that these personality traits will translate into online behavior. As the present time perspective has been found to be associated with problematic behavior, including Internet addiction and procrastination (Kim et al. 2017; Zabelina et al. 2018), we assume its influence will lead to a high amount of online activity, including immersion and online procrastination (the deliberate, irrational postponement of planned actions due to spending time on the Internet, despite the future negative effects). A person with such a perspective will engage in regular activities on social media and online communication or waste time surfing online. The third hypothesis is built on contradistinctions between the past-positive and past-negative time perspectives described in previous studies: pessimistic–optimistic, aversive–caring, cold–warm, neglectful–appreciative, hard–sensitive (Zimbardo & Boyd 1999; Stolarski et al. 2014; Precin 2017). We expect that these differences will give rise to contrasting behavior in terms of manners, where the past-negative time perspective induces harsh online behavior, and the past-positive time perspective polite ones. A dominating future time perspective affects work and educational settings, including job performance, proactive work behavior, and school performance, while it also contributes to motivation and the preference for purposive, goal-directed activities, rather than pleasure-seeking ones (Kooij et al. 2018). Based on these findings, we assume that such people will use the Internet in a functional way as a goal-achieving tool.

Methodology

Sample and Procedure

In order to examine the relation between time perspectives and online behavior, a questionnaire survey was conducted among digital natives at the tertiary education level (in particular, Polish students from various higher education institutions). The study was conducted using the Computer Assisted Web Interviewing (CAWI) method. The sample was non-random, consisting of people aged 18–37 from six regions of Poland (in the north, north-west, central, south-west, south, and east), registered in a research panel. Digital natives are by definition people who have constant access to the Internet, and therefore the main limitation of this method of research is no longer relevant. Thanks to this technique, errors and the influence of the interviewer on the survey are eliminated, and the respondents can fill in the questionnaire at any time and place without time limits. The method is conducive to maintaining anonymity, which may positively affect the reliability of responses. Visual elements can be applied, and the cost of a study conducted on the basis of this method is small. The disadvantages, however, are the inability to control interfering factors and uncertainty over whether a questionnaire was answered by a given respondent. The total number of participants was 569. Among them, seven were excluded due to their lack of a dominant time perspective. Thus, the analyses presented below are based on the results from 562 individuals. All the participants were informed about the range and aim of

the study and their consent was obtained before they completed the online questionnaire. The data was collected in October 2017.

Measures

The Zimbardo Time Perspective Inventory

The ZTPI was designed to identify a person's time-perspective orientation by diagnosing five time perspectives: two past, two present, and one future. The psychometric examination determines an individual profile. If a person scores high in only one of the time perspectives, a bias toward this perspective is ascertained (Precin 2017). The ZTPI is one of the most widely used instruments to assess an individual's set of time perspectives (Worrell et al. 2016). Initially designed as a 56-item questionnaire (with responses given on a 5-point Likert scale) by Zimbardo and Boyd (1999), it has been used in numerous countries (Apostolidis & Fieulaine 2004; Díaz-Morales 2006; Milfont et al. 2008; Carelli et al, 2011; Przepiorka & Blachnio 2016) and translated into several languages. Shorter versions have been designed as well, for instance, the SZTPI-15 (Zhang et al. 2013b), ZTPI-25 (Laghi et al. 2009), the 25-item ZTPI-TP (Worrell et al. 2016), and the ZTPI-36 (Sircova et al. 2014). It is perceived as the most reliable and valid index of time perspectives (Sword et al. 2013) and has also been considered the best method for measuring the time construct (Worrell et al. 2016).

We assigned each respondent to a time-perspective group based on the person's assessed time-perspective bias. If the score for two or more time perspectives was the same, the participant was excluded from further analysis. Out of the entire sample there were only seven such instances. The rest were ascribed one of the following time dimensions: past positive (M = 3.4, SD = .60, 29.00%, Cronbach's α = .79); past negative (M = 2.9, SD = .73, 11.74%, Cronbach's α = .73); present hedonistic (M = 2.6, SD = .57, 27.58%, Cronbach's α = .78); present fatalistic (M = 3.4, SD = .63, 3.02%, Cronbach's α = .70); and future (M = 3.3, SD = .61, 28.64%, Cronbach's α = .78).

Online Behavior

This construct was assessed using a 24-item original questionnaire developed on the basis of the above-mentioned literature. It examined behavior exhibited on the Internet and social media. Single-choice questions were asked in regard to frequency of usage, number of SNS active accounts, and six individual behavior (photo retouching, publishing false information about oneself and others, willingness to cease using the Internet and social media, being a personal blogger, and readiness to display uninhibited behavior online). Other inquiries about behavior (regular actions, motives, online perceptions of oneself and others) were constructed in a multiple-choice format. A query concerning Facebook acquaintances was open so that a participant could declare an exact number.

After defining these behavior on the basis of the literature and the authors' expertise, they were presented as sets: a high level of engagement in content-providing; a functional approach; rude practices; and a tendency toward procrastination and online immersion.

Data Analysis

First, each subject was assigned to one of five groups according to his or her dominant time perspective. Questions concerning online behavior were analyzed for each group, in order to examine the possible relationships. The Chi-square independence test and Kruskal-Wallis test were used to verify an association between time perspectives and online behavior. The former was applied in order to examine relationships between nominal and ordinal variables, or two nominal ones. The Kruskal-Wallis test was adopted specifically for the question about the estimated number of Facebook friends.

Results

It was demonstrated that the participants used the Internet and social media with high frequency. Such intense engagement is typical for digital natives, to which cohort the participants belonged. The majority of subjects declared that they were regularly present in cyberspace (Tables 1 and 2).

Table 1

Frequencies of using social media and the internet for each time perspective

Frequency of using social media		Time Perspective					Total
		PN	PP	PF	PH	F	
Regularly	n	56	141	15	138	140	**490**
	%	85	87	88	89	87	**87**
Occasionally	n	6	12	2	12	12	**44**
	%	9	7	12	8	7	**8**
Infinitesimal	n	4	10	0	5	9	**28**
	%	6	6	0	3	6	**5**
Total	**n**	**66**	**163**	**17**	**155**	**161**	**562**
	%	**100**	**100**	**100**	**100**	**100**	**100**

Chi-square test: $\chi^2 = 19.63$. df = 24. p = 0.72
n = 562

Frequency of using the internet		Time Perspective					Total
		PN	PP	PF	PH	F	
Regularly	n	58	150	16	145	147	**516**
	%	89	94	94	94	92	**92**
Occasionally	n	5	7	1	8	10	**31**
	%	7	5	6	5	7	**7**
Infinitesimal	n	2	1	0	1	2	**6**
	%	4	1	0	1	1	**1**
Total	**n**	**65**	**158**	**17**	**154**	**159**	**553**
	%	**100**	**100**	**100**	**100**	**100**	**100**

Chi-square test: $\chi^2 = 25.92$. df = 24. p = 0.36
n = 553

In order to describe the results in a coherent and transparent manner, only the most significant were presented. The behavior were displayed in four groups, expressing: (1) an

Table 2

Regular activity on SNS and time perspectives

SNS		Time Perspective					Total	Chi-square test: (df = 4)
		PN	PP	PF	PH	F		
Facebook	n	51	118	11	128	129	**437**	$\chi^2 = 7.00.$
	%	77	72	65	83	80	**78**	p = 0.14
YouTube	n	36	83	10	87	79	**295**	$\chi^2 = 2.13.$
	%	55	51	59	56	49	**52**	p = 0.71
Instagram	n	12	43	5	52	34	**146**	$\chi^2 = 8.80.$
	%	18	26	29	34	21	**26**	p = 0.07
Snapchat	n	14	42	8	48	19	**131**	$\chi^2 = 23.10.$
	%	21	26	47	31	12	**23**	p = 0.00
Twitter	n	7	5	1	6	8	**27**	$\chi^2 = 6.28.$
	%	11	3	6	4	5	**5**	p = 0.18
Blog	n	1	6	2	10	8	**27**	$\chi^2 = 4.74.$
	%	2	4	12	6	5	**5**	p = 0.32
I don't use SNS	n	2	9	0	3	6	**20**	$\chi^2 = 3.71.$
	%	3	6	0	2	4	**4**	p = 0.45
Other	n	3	3	0	7	6	**19**	$\chi^2 = 2.72.$
	%	5	2	0	5	4	**3**	p = 0.61
Pinterest	n	0	8	1	5	4	**18**	$\chi^2 = 4.37.$
	%	0	5	6	3	2	**3**	p = 0.36
NK.pl	n	0	4	1	3	2	**10**	$\chi^2 = 3.55.$
	%	0	2	6	2	1	**2**	p = 0.47
Vine	n	0	2	0	2	0	**4**	$\chi^2 = 3.10.$
	%	0	1	0	1	0	**1**	p = 0.54
Flickr	n	0	0	0	1	0	**1**	$\chi^2 = 2.63.$
	%	0	0	0	1	0	**0.2**	p = 0.62

Note. Multiple choice question, so the percentages don't sum up to 100%.

engaged, active, content-provider attitude; (2) a functional, everyday-user approach; (3) distrustful, harsh, rude practices; (4) procrastination and immersion. In each set, significant behavior were found: 10, 6, 7, and 4 respectively. Table 3 presents the percentage of participants from each time perspective who declared that they had behaved in the manner specified. All the behavior are dichotomous variables (except the number of Facebook friends), presenting an average for every time-perspective group. We estimated higher and lower levels of probability of these behavior among particular groups in comparison to others (PN—past negative, PP—past positive, PF—present fatalistic, PH—present hedonistic, F—future). A higher probability than in other groups means that subjects with a particular time-perspective bias performed an activity more often than other groups, while a lower probability means that they seldom performed a particular activity.

The data presented in Table 3 shows that the past-negative and present-fatalistic participants were more likely to evince a rude approach than other time-perspective groups. This can be considered a confirmation of H1. The prediction that present-oriented people show a tendency to achieve a higher level of online activity than people evincing adverse time-perspective biases (H2) seems to be proved by the data in Tables 1 and 2, which show

Table 3

**Time perspectives and probabilities of performing online behaviours
(Chi-square and Kruskal-Wallis test)**

Engaged, content provider behaviours	χ^2/H	Time perspective				
		PN	PP	PF	PH	F
Regular activity on Snapchat	23.10***	21%	26%	47%+	31%	12%−
Possessing an active account on more than 6 SNS	31.31**	11%	2%−	24%+	7%	4%
Being a personal blogger	10.60*	8%	3%−	20%+	4%	7%
Publish content on selected topics	12.82**	8%	6%−	29%+	11%	13%
Searching for news/trends	10.00*	42%	56%	65%+	45%	58%
Perceiving others as authentic	11.32*	14%−	25%	35%+	15%	16%
Searching for new acquaintances	6.65*	15%	10%	29%+	16%	8%
Being active	12.86**	33%	31%	59%+	43%	29%−
Perceiving the internet as influencing subject's personality	14.20**	18%+	6%	18%+	5%−	9%
Number of Facebook friends	21.46***a	300	420	235	450	400
Median (interquartile range)		(295)	(350)	(237,5)	(350)	(400)

Functional, simple user approach	χ^2/H	Time perspective				
		PN	PP	PF	PH	F
Possessing no active account on SNS	31.31**	5%+	3%	0%−	1%	5%+
Possessing an active account on 1 SNS	31.31**	18%	17%	0%−	14%	21%+
Possessing an active account on 2–3 SNS	31.31**	45%−	50%	47%	49%	50%+
Using the internet for work/study purposes	16.06***	48%	60%	35%−	58%	71%+
Shopping online	10.08*	24%−	45%+	29%	43%	42%
Not publishing false information about others	48.41***	42%	56%+	24%−	55%+	50%

Distrustful, harsh approach	χ^2/H	Time perspective				
		PN	PP	PF	PH	F
Perceiving others as false	17.44***	23%+	9%−	12%	21%	14%
Perceiving others as unhelpful	12.76**	6%	1%−	12%+	4%	8%
Publishing false information about others	48.41***	2%	0%−	6%+	0%−	1%
Quarrelling	10.44*	23%+	8%−	12%	17%	15%
Being a hater	18.47***	15%	7%−	35%+	17%	8%
Performing uninhibited behaviours	31.44***	61%+	21%−	47%	36%	34%
Being less brave, cowardly	9.98*	5%	1%−	12%+	2%	3%

Procrastination, immersion	χ^2/H	Time perspective				
		PN	PP	PF	PH	F
Perceiving online life as more important than a real one	11.81*	6%+	1%	0%−	1%	1%
Excessive shopping online	11.16*	8%	17%	6%−	24%+	16%
Procrastination on social media	9.70*	52%	56%	47%	60%+	43%−
Procrastination on chatting with others	12.83**	27%−	47%	41%	49%+	36%

Note. +—higher probability than in other groups; − —lower probability than in other groups.

p-value: *p < .05,   **p < .01,   ***p < .001

  a Kruskal-Wallis test. The rest of values in this column are χ^2.

these groups to be the most engaged in regular internet and social media activity. Table 3 also shows that these participants were the most likely to exhibit engaged, content-provider behavior, as well as to spend too much time online, be overly immersed in cyberspace, and procrastinate. As past-positive-oriented people were less likely to behave rudely or harshly (Table 3), H3 was also supported. Finally, as we assumed in H4, participants with a future time-perspective orientation more often showed a functional approach to Internet use (Table 3) than the other time-perspective groups.

Discussion

There is a growing body of evidence suggesting that time perspectives influence human behavior (Holman & Zimbardo 2009; Garcia et al. 2017). The relatively low number of studies concerning online behavior, however, hampers further development of the research field. In particular, there is a compelling need to research the online habits of young people—digital natives who have integrated the Internet in their everyday life in a specific, unconscious way. The present study, which is aimed at testing the relation between time perspectives and online behavior, thus enhances the existing literature. In general, our study contributes to the understanding of how time perspectives are linked with differences in online behavior.

In terms of the hypotheses we formulated, the prediction that people evincing adverse time-perspective biases show a tendency toward rude, harsh, and distrustful online behavior (H1) was supported. Only past-negative and present-fatalistic perspectives were found to be more likely to be related with a group of behavior that can be categorized as distrustful and harsh. Respondents with the past-positive perspective very much less often declared that they engaged in such behavior; the present-hedonistic perspective was merely negatively associated with the behavior, while the future orientation was not linked at all. We expected that present-oriented participants would display high activity online (H2). The results showed that present-hedonistic-oriented participants evinced the strongest tendency of all the groups to procrastinate online. As present-hedonistic people evince self-indulgence, levity, thoughtlessness, and affinity for instant gratification and having a good time (Keough et al. 1999; Precin 2017), this finding seems justified. More surprising may be the result showing the high engagement in content-provision of present-fatalistic participants, as this cohort is defined by a powerless approach to life, with an inclination toward fatalism and hopelessness (Zimbardo & Boyd 1999). The hypothesis (H3) about the different levels of online courteousness evinced by past positive-oriented and past negative-oriented participants was also supported. Rude and undesirable behavior (i.e., hating, lying, cowardice) were positively related with the past-negative orientation, while the past-positive orientation was negatively linked to each unpleasant behavior found to be statistically significant. Finally, we assumed that a dominating future-time perspective occurs concomitantly with a functional approach to Internet use (H4). We found the highest number of positive relations between the future perspective and behavior categorized as functional, with only limited relations between those behavior and the past-positive and present-hedonistic orientations. The adverse time perspective was the only one

to be negatively associated with this set of behavior. By supporting the above hypotheses, we observed a relationship between time perspectives and online behavior among digital natives at the tertiary education level and answered the research question positively.

Although the results obtained seem promising, this study certainly has limitations. First, we relied on self-reporting: we obtained only quasi-behavioral data and had no way of monitoring actual online behavior. Nevertheless, data based on declarations has been proven valid for studies such as ours (Zimbardo & Boyd 1999; Kühberger et al. 2002). Second, although a compelling set of behavior was found to be statistically significant, a considerable part was not. We were particularly puzzled by the lack of relation between time perspectives and, for instance, publishing false information about oneself, the willingness to cease online life, and perceptions of social media and its users. There were also very few relations attributed to perceptions of oneself online. We feel that these findings need further verification, and developing other ways of studying people's online self-perceptions would be valuable. Third, while the ZTPI is seen as a reliable and valid measure of time-perspective biases (Zimbardo & Boyd 1999; Sekścińska et al. 2018), it is not without controversy. The tool's single future dimension may be perceived as a limitation (Zimbardo & Boyd 1999). Still, the ZTPI encapsulates well the subjective sense of time in adolescence and later youth (Molinari et al. 2016). Finally, the time-perspective biases of the participants were diagnosed at the data analysis stage; hence, the numbers in the five groups vary. The study did not include demographic and socioeconomic variables about the respondents, as the only variable that was important for the research was the time-perspective orientation. These variables will be included in further research by the authors. Avenues for future research include cross-cultural studies and the broadening of age groups. It would be interesting to examine the relationships between different online behavior, as well as perceptions of online life and time perspectives, in different cultures and at different ages and moments in life.

Conclusions

Despite its limitations, the study extends the growing literature on online behavior among digital natives. It also adds to previous findings by examining the role of time perspectives in forming such behavior. We found a set of positive and negative associations between particular time-perspective orientations and online habits. Nonetheless, it was also revealed that the nature of the relationship between time perspectives and online behavior is not so straightforward. For example, present-fatalistic participants, who are perceived as powerless and bleak in outlook, evinced a high level of engagement in online activities and content-provision.

Overall, this paper contributes to the understanding of how time-perspective characteristics may predict an individual's social media and online behavior. These findings afford a better appreciation of the mechanisms behind online activities. They could be useful for teachers working with adolescents; psychologists; psychiatrists; coaches; and, especially, web users themselves.

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Zimbardo Time Perspective Inventory

Read each item and, as honestly as you can, answer the question: "How characteristic or true is this of me?" In this part, you must answer all 56 of the required questions.

	Very Untrue → Neutral → Very True				
	1	2	3	4	5
1. I believe that getting together with one's friends to party is one of life's important pleasures.					
2. Familiar childhood sights, sounds, smells often bring back a flood of wonderful memories.					
3. Fate determines much in my life.					
4. I often think of what I should have done differently in my life.					
5. My decisions are mostly influenced by people and things around me.					
6. I believe that a person's day should be planned ahead each morning.					
7. It gives me pleasure to think about my past.					
8. I do things impulsively.					
9. If things don't get done on time, I don't worry about it.					
10. When I want to achieve something, I set goals and consider specific means for reaching those goals.					
11. On balance, there is much more good to recall than bad in my past.					
12. When listening to my favorite music, I often lose all track of time.					
13. Meeting tomorrow's deadlines and doing other necessary work come before tonight's play.					
14. Since whatever will be will be, it doesn't really matter what I do.					
15. I enjoy stories about how things used to be in the "good old times."					
16. Painful past experiences keep being replayed in my mind.					
17. I try to live my life as fully as possible, one day at a time.					
18. It upsets me to be late for appointments.					
19. Ideally, I would live each day as if it were my last.					
20. Happy memories of good times spring readily to mind.					
21. I meet my obligations to friends and authorities on time.					
22. I've taken my share of abuse and rejection in the past.					
23. I make decisions on the spur of the moment.					
24. I take each day as it is rather than try to plan it out.					
25. The past has too many unpleasant memories that I prefer not to think about.					
26. It is important to put excitement in my life.					
27. I've made mistakes in the past that I wish I could undo.					
28. I feel that it's more important to enjoy what you're doing than to get work done on time.					
29. I get nostalgic about my childhood.					
30. Before making a decision, I weigh the costs against the benefits.					
31. Taking risks keeps my life from becoming boring.					

	Very Untrue → Neutral → Very True				
	1	2	3	4	5
32. It is more important to enjoy life's journey than to focus only on the destination.					
33. Things rarely work out as I expected.					
34. It's hard for me to forget unpleasant images of my youth.					
35. It takes joy out of the process and flow of my activities if I have to think about goals, outcomes, and products.					
36. Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences.					
37. You can't really plan for the future because things change so much.					
38. My life path is controlled by forces I cannot influence.					
39. It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway.					
40. I complete projects on time by making steady progress.					
41. I find myself tuning out when family members talk about the way things used to be.					
42. I take risks to put excitement in my life.					
43. I make lists of things to do.					
44. I often follow my heart more than my head.					
45. I am able to resist temptations when I know that there is work to be done.					
46. I find myself getting swept up in the excitement of the moment.					
47. Life today is too complicated; I would prefer the simpler life of the past.					
48. I prefer friends who are spontaneous rather than predictable.					
49. I like family rituals and traditions that are regularly repeated.					
50. I think about the bad things that have happened to me in the past.					
51. I keep working at difficult, uninteresting tasks if they will help me get ahead.					
52. Spending what I earn on pleasures today is better than saving for tomorrow's security.					
53. Often luck pays off better than hard work.					
54. I think about the good things that I have missed out on in my life.					
55. I like my close relationships to be passionate.					
56. There will always be time to catch up on my work.					

Part II: Social media

1) I use social media (SNS):
   - ☐ All the time
   - ☐ A few times a month
   - ☐ Several times a day
   - ☐ Once a day
   - ☐ A few times a week
   - ☐ Less often
   - ☐ Not at all

2) My favorite social networking sites are:
   - ☐ Facebook
   - ☐ YouTube
   - ☐ Instagram
   - ☐ Twitter
   - ☐ Pinterest
   - ☐ Snapchat
   - ☐ Flickr
   - ☐ Vine
   - ☐ NK.pl
   - ☐ Blogs
   - ☐ Other . . . .
   - ☐ I don't use SNS

3) Number of social networking sites on which I possess an active account is:
   - ☐ 0 ☐ 1 ☐ 2–3 ☐ 4–5 ☐ 6 and more

4) My main reasons for using SNS are:
- ☐ Communication with others
- ☐ Searching for news
- ☐ Hobby
- ☐ Work/study
- ☐ Searching for new acquaintances
- ☐ Wasting time
- ☐ Other . . . .
- ☐ No reason
- ☐ I don't use SNS

5) My Most common activities on SNS are:
- ☐ Browsing
- ☐ Commenting
- ☐ Tagging
- ☐ Writing about my life
- ☐ Publishing content on selected topics
- ☐ Other . . . .
- ☐ I don't use SNS

6) I'm most interested in a content published by:
☐ Friends ☐ Communities ☐ Organizations ☐ Celebrities ☐ Other . . . .
☐ I don't use SNS

7) I retouch published photo:
☐ Regularly ☐ Often ☐ From time to time ☐ Never ☐ I don't publish photos
☐ I don't use SNS

8) I may publish false information about oneself:
☐ Regularly ☐ Often ☐ From time to time ☐ Never ☐ I don't publish photos
☐ I don't use SNS

9) I may publish false information about others:
☐ Regularly ☐ Often ☐ From time to time ☐ Never ☐ I don't publish photos
☐ I don't use SNS

10) I can live without SNS:
☐ Yes ☐ No ☐ I don't use SNS

11) SNS for me are:
- ☐ Useful tools
- ☐ A way of spending free time
- ☐ A way of life
- ☐ Necessary part of life
- ☐ Unnecessary part of life

12) For me, authors of followed content are:
- ☐ Authorities
- ☐ Inspiration
- ☐ Source of knowledge
- ☐ I only follow my friends
- ☐ Other . . . .
- ☐ I don't use SNS

13 My Facebook friends number: . . . .

Part III: the internet

1) I use the internet:
- ☐ All the time
- ☐ Several times a day
- ☐ Once a day
- ☐ A few times a week
- ☐ A few times a month
- ☐ Less often
- ☐ Not at all

2) My main reasons for using the internet are:
- ☐ Communication with others
- ☐ Searching for news
- ☐ Following blogs/videoblogs
- ☐ Hobby
- ☐ Work/study
- ☐ Shopping
- ☐ Searching for new acquaintances
- ☐ Wasting time
- ☐ Online games
- ☐ Other . . . .
- ☐ No reason
- ☐ I don't use SNS

3) I publish a content that usually is:
- ☐ Down to earth, without emotions
- ☐ Highly emotional
- ☐ Kind
- ☐ Aggressive
- ☐ Mean
- ☐ Other . . . .

4) Sometimes I:
- ☐ Hate
- ☐ Quarrel
- ☐ Lie
- ☐ Download files illegally

- ☐ Help victims of haters
- ☐ Advise
- ☐ Participate in social activities

5) I'm a blogger: ☐ Yes ☐ No

6) My online life:
- ☐ Is marginal
- ☐ Makes everyday activities easier
- ☐ Influences who I am

- ☐ Is an important part of my identity
- ☐ Is more important than my real life

7) While being online, I'm:
- ☐ Searching for old friends
- ☐ Searching for new friends

- ☐ Staying in touch with my current friends

8) While being online, I usually am:
- ☐ Active
- ☐ Kind
- ☐ Open
- ☐ Braver
- ☐ Honest
- ☐ Communicative
- ☐ More inhibited

- ☐ Passive
- ☐ Aggressive
- ☐ Covert
- ☐ Less brave
- ☐ Willing to abuse
- ☐ Introvert
- ☐ Uninhibited

9) I feel I can be uninhibited online: ☐ Yes ☐ No

10) People on the internet are usually for me:
- ☐ Kind
- ☐ Helpful
- ☐ Authentic
- ☐ Mild

- ☐ Unkind
- ☐ Unhelpful
- ☐ Keeping up appearances
- ☐ Aggressive

11) Sometimes I spend too much time online on:
- ☐ Gaming
- ☐ Social media
- ☐ Chatting
- ☐ Shopping

- ☐ Searching for news
- ☐ Other . . . .
- ☐ None—I control my time spent online