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Time perspective as a predictor of problematic Internet use: a study of Facebook users

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Abstract

Time perspective (TP) has been related to different problematic human behaviors. The work presented in this paper assesses the role of time perspective in predicting problematic Internet use (PIU) by studying a sample (n=149) of Facebook users. Participants (79 male, 70 female, mean age=32.40, SD=11.80) completed electronic versions of the Zimbardo Time Perspective Inventory (ZTPI) to assess their TP, and the Generalized Problematic Internet Use Scale 2 (GPIUS2) to assess their PIU. Results show that Past Negative and Present Fatalistic temporal frames are predictors of problematic Internet use, suggesting that time perspective is an individual difference construct that should be taken into consideration in the context of PIU.

Keywords*:* Time perspective, Temporal frames, Problematic Internet use, Facebook users.

1. Introduction

As Internet use becomes more and more widespread and frequent among people, the issue of problematic Internet use (PIU) grows in importance. PIU is a multidimensional syndrome that consists of cognitive, emotional, and behavioral symptoms that result in difficulties with managing one's offline life (Caplan, 2005). Concern about PIU is motivated by the negative outcomes that PIU could lead to, such as work or school related problems (Young, 1998) and social skill deficit (Caplan, 2005; Kraut, Patterson, Lundmark, Kiesler, Mukopadhyay, & Scherlis, 1998).

Our research aims at studying the possible relations between time perspective (TP) and PIU. TP can be defined as "a relatively stable individual-differences process" by which individuals partition the flow of human experience into the distinct temporal categories (or frames) of past, present, and future (Zimbardo, Keough, & Boyd, 1997; Zimbardo & Boyd, 1999). When the use of one of the three temporal frames is overemphasized in making decisions, it serves as a cognitive temporal bias toward being past, future, or present oriented (Zimbardo & Boyd, 1999). For example, individuals with a future TP focus on the achievement of future goals and the desirability of future states resulting from their current behavior, while individuals with a present orientation tend to be influenced by the more immediate consequences of their behavior and are less concerned about future consequences (Boniwell & Zimbardo, 2004; D'Alessio, Guarino, De Pascalis, & Zimbardo, 2003; Zimbardo & Boyd, 1999). Studies in the literature have shown that a particular time orientation can be a predictor of different problematic human behaviors, such as risky driving (Zimbardo et al., 1997) and substance abuse (Keough, Zimbardo, & Boyd, 1999). To the best of our knowledge, no study so far has investigated the possible relationship between TP and PIU.

2. Related work

This section briefly surveys TP and PIU studies, and the instruments we used to assess the two constructs.

2.1. Time perspective

Zimbardo and Boyd (1999) developed a scale to measure TP, the Zimbardo Time Perspective Inventory (ZTPI), which subdivides the past, present and future temporal frames into five subscales, or subframes. The Past Negative (PN) subscale reflects a generally negative, aversive view of the past, which may be due to actual experiences of unpleasant or traumatic events, negative reconstructions of benign events, or to a mix of both. The Past Positive (PP) subscale reflects a more sentimental and warm view of the past. The Present Hedonistic (PH) subscale reflects a hedonistic, risk-taking attitude towards time and life. It suggests an orientation towards present pleasure with little concern for future consequences. The Present Fatalistic (PF) subscale reflects a fatalistic, helpless, and hopeless attitude towards life. Finally, the Future (F) subscale reflects a general future orientation, suggesting that behavior is dominated by a striving for future goals and rewards. The ZTPI contains 56 items that ask respondents to indicate how characteristic a statement is of them on a 5-point Likert scale ranging from 1 (*very uncharacteristic*) to 5 (*very characteristic*). The PN subscale is composed by 10 items, PP by 9 items, PF by 9 items, PH by 15 items and F by 13 items. The score obtained on each subscale is independent of those obtained on the other subscales. A high score on a subscale reveals a temporal orientation of an individual on that temporal frame, while the overall time perspective of an individual is defined by the different results obtained on the five subscales.

The ZTPI has been used in the literature to investigate the relationships between TP and other personality concepts, e.g. some researchers have shown associations between TP and the Big Five personality traits, i.e. Neuroticism, Extraversion, Conscientiousness, Agreeableness, and Openness to experience (Costa & McCrae, 1992). The strongest association that emerged was between F and Conscientiousness (Adam & Nettle, 2009; Dunkel & Weber, 2010; Keough et al., 1999). Other studies have shown that a prevalence of a particular temporal frame has implications for various aspects of human behavior, see (Drake, Duncan, Sutherland, Abernethy, & Henry, 2008) for a review. In the following, we will focus on the relationships that have been found between TP and problematic human behaviors.

Zimbardo and Boyd (1999) found that a prevalence of PN is correlated with depression, anxiety and low self-esteem. Moreover, it has been shown that past negative oriented individuals have fewer close friends (Zimbardo & Boyd, 1999) and are more likely to be in alcohol and drug programmes (Klingeman, 2001) than people with a different time orientation. Present oriented (PH and PF) individuals have been shown to be less influenced by safe sex practices (Rothspan & Read, 1996) and more likely to engage in risky driving (Zimbardo et al., 1997), alcohol and drug misuse (Keough et al., 1999) and to suffer chronic homelessness (Epel, Bandura, & Zimbardo, 1999). PF is also associated with aggression, anxiety, depression (Zimbardo & Boyd, 1999), and with avoidant procrastination, while PH is associated with arousal procrastination (Ferrari & Diazmorales, 2007). Prevalence in both PF and PN frames was shown to discriminate between severe suicidal ideators and nonideators among high school students (Laghi, Baiocco, D'Alessio, & Gurrieri, 2009).As reported in (Drake et al., 2008), future orientation has been associated with less problematic behaviors. It has, however, been suggested that an overemphasis on future goals compromises spontaneity resulting in poor ability to switch off and enjoy the present (Boniwell & Zimbardo, 2004).

Considering the role that TP has in various problematic behaviors, it is worth investigating whether TP can be a predictor also for PIU.

2.2. Problematic Internet use

In the literature, different names have been used to refer to ways of using the Internet that lead to negative outcomes, e.g. Internet addiction (Young, 1998), Internet abuse (Morahan-Martin, 1999), and problematic Internet use (Caplan, 2002). The different terms reflect the different conceptualizations that have been given of PIU. According to the review by Morahan-Martin (2008), despite the different conceptualizations of PIU in the literature, there is a general agreement that PIU is defined in terms of the negative effects of Internet use, which can affect an individual's life. Moreover, researchers agree that PIU involves preoccupation with using the Internet, compulsive Internet use, subjective feelings of inability to limit use, and using the Internet to escape or alter negative moods.

As a result of different attempts to conceptualize the PIU construct, a number of measurement scales have been developed, e.g. (Jia & Jia, 2009; Moreno, Jelenchick, Cox, Young, & Christakis, 2011). In our study we employ Caplan's Generalized Problematic Internet Use Scale 2 (GPIUS2) (Caplan, 2010), because it taps all the aspects mentioned above, which most researchers agree are related to PIU despite the different conceptualizations they adopt for PIU.

The GPIUS2 consists of five subscales that tap four constructs. The first subscale concerns Preference for Online Social Interaction (POSI), which is characterized by beliefs that one is safer, more efficacious, more confident, and more comfortable with online interpersonal interactions and relationship than with traditional face-to-face social activities. The second subscale taps Mood Regulation (MR), which emphasizes the motivation to use the Internet to

alleviate distressing feelings. The third and fourth subscales, Cognitive Preoccupation (CP) and Compulsive Internet Use (CIU) focus on Deficient Self-Regulation (DSR). In particular, CP refers to obsessive thought patterns involving Internet use, while CIU reflects the compulsive nature of PIU. The fifth subscale taps Negative Outcomes (NO), which reflects the negative outcomes that are associated with a problematic use of the Internet. The GPIUS2 contains 15 items that ask respondents to rate their extent of agreement on an 8-point scale (1=*definitely disagree*, 8 = *definitely agree*). Each of the five subscales contains 3 items. The GPIUS2 scale can be used in two different ways: as a set of separate subscales or as an overall composite score which reflects the degree of PIU of an individual (Caplan, 2010). In our study, we consider both the composite score (GPIUS2CS) and the five subscales.

3. Study

3.1. Hypothesis

Given the dependence aspect that could be involved in PIU and the association of TP with problematic behaviors that have an addictive component, such as substance abuse and reduced offline social contacts, we hypothesize that TP predicts PIU. In particular, considering the role of PN and PF reported by the literature with respect to addiction and social contacts, we hypothesize that people who score high on PN or PF should report a high PIU.

3.2. Method

The study was carried out on a sample of Facebook users. To collect data for the study, we created a Facebook application that contained an electronic, Italian-translated version of the ZTPI and the GPIUS2. Study participants could answer the questionnaires by logging in to

their Facebook profile and then using the application. They were preliminarily informed by the application that they would be allowed to answer each questionnaire only once. To thank participants, after they completed questionnaires, the application provided them with the obtained scores and explanations of the scales.

Before starting with the questionnaires, the application asked participants for permission to have access to their basic profile information such as gender and age. Since age and gender information can be missing from the Facebook profile information, the initial page of both questionnaires asked participants to enter their gender and age. The application recorded the answer to each question, the final scores, and the time required by the participant to complete each questionnaire. It also checked for possibly skipped answers on questionnaire items and initial demographic data, and asked participants to enter them.

To recruit participants, the application was included in the Facebook app directory and its availability was announced on the web site of an Italian newspaper. Moreover, the application offered participants the standard Facebook “Invite friends” option. Participants were also given the opportunity to publish a link to the application on their Facebook Wall with a single click.

3.3. Participants

For 6 months since the day of the announcement, we stored the data collected by the application in a secure database. The application was used by 692 Facebook users: 459 participants chose to answer the ZTPI only, 78 participants the GPIUS only, and 155 participants answered both questionnaires. These 155 participants form the sample of our study.

We used questionnaire completion time data to identify cases that could need to be removed,

because extremely quick completion times on on-line surveys suggest that respondents have not given the questions due consideration and thus can introduce lower quality data in the dataset while a long completion time might mean that respondents have been interrupted while filling out the questionnaire (Malhotra, 2008). To exclude these cases, we followed the approach of previous studies with online surveys (Yan & Tourangeau, 2008), analyzing the data for outliers and dropping the participants who were in the lower and upper one percentile of time completion values in at least one of the questionnaires. Based on this analysis, 6 participants were discarded. We did not take into consideration participants' connectivity speed, as each page of the questionnaires was very small (no larger than 59 Kb) and did not contain any image or video. In these cases, differences in connectivity speed should not produce meaningful differences in completion times (Malhotra, 2008).

Among the remaining 149 participants, the mean completion time for ZTPI was 519 seconds (SD=227.33), while for GPIUS2 was 124 seconds (SD=53.79). The mean of participants' self-reported age was 32.40 years (SD=11.80).

Bases on participants' self-reported data, there were 79 male and 70 female respondents in the sample. For 21 participants, the Facebook user profile did not contain gender information and we used the gender they had stated in the questionnaires. For the remaining 128 participants, gender information was available in their Facebook profile as well in the questionnaires. For these participants we checked if there were any mismatches between the gender stated in their Facebook profile and the gender stated in the questionnaires and there was a mismatch for only one participant. In this single case of mismatch, we used the gender reported on the Facebook profile as the participant's gender. In general, Facebook encourages more truthful profiles than other online social networks (Lampe, Ellison, & Steinfield, 2007).

3.4. Measures

3.4.1. ZTPI

Participants completed the electronic, Italian version of the ZTPI, which had good internal reliability. Cronbach's alpha for PN was .82 in the Italian version (.82 in the English version (Zimbardo & Boyd, 1999)), for PP .71 (.80), for PF .71 (.74), for PH .78 (.79) and for F .66 (.77).

3.4.2. GPIUS2

Participants completed the electronic, Italian version of the GPIUS2, which had good internal reliability. Cronbach's alpha for GPIUS2CS was .89 (.91 in the English version (Caplan, 2010)), for POSI .87 (.82), for MR .81 (.86), for CP .83 (.86), for CIU .84 (.87) and for NO .86 (.83)

4. Results

4.1. Relations between the ZTPI subscales and GPIUS2CS

4.1.1. Zero-order correlations

Data were first subjected to the Kolmogorov-Smirnov test of normality. The test revealed deviations from the normal distribution for GPIUS2CS and PP. The relationships between GPIUS2CS and the ZTPI subscales were thus assessed using Kendall's rank correlation coefficient. Results were then converted to Pearson's r following Walker (2003) (Table1). Zero-order correlations showed that GPIUS2CS correlated moderately with PN and weakly with PF. Also, significant correlations between some ZTPI subscales were found: PN correlated weakly and negatively with PP; PN strongly and positively with PF; PH weakly

and positively with PF; PH weakly and negatively with F; PF moderately and negatively with F.

We also tested if GPIUS2CS and the ZTPI subscales correlated with age and gender, which was dummy coded (0=men, 1=women), finding no significant correlations.

Table 1 – Converted Pearson correlations (from rank order correlations) between ZTPI subscales and GPIUS2CS.

	PN	PP	PH	PF	F
GPIUS2CS (M=48.41, SD=17.89)	.37***	-.08	-.03	.26**	-.09
PN (M=3.22, SD=.69)		-.22*	-.02	.54***	-.17
PP (M=3.38, SD=.57)			.13	.06	.09
PH (M=3.46, SD=.47)				.25**	-.25**
PF (M=2.69, SD=.56)					-.37***
F (M=3.30, SD=.45)					

Note: n=149, * p < .05. ** p < .01. *** p < .001.

4.1.2. Partial correlations

The zero-order correlations revealed that PN and PF are both correlated with GPIUS2CS. These correlations were of our primary interest, considering the aim of the study. Moreover, we found that PN correlated strongly and positively with PF. This correlation suggests that the use of the two subscales together when attempting to predict PIU might be possibly redundant and that the two subscales might not be two independent predictors. For this

reason, we carried out two partial correlations, the first involving GPIUS2CS and PN partialing out PF, and the second involving GPIUS2CS and PF partialing out PN. The correlation between PN and GPIUS2CS remained significant after partialing out PF scores (τ=.19, r=.29, p <.001).

4.1.3. Linear regressions

In order to better investigate the effects of PN and PF on PIU we carried out two linear regressions. For both regressions, GPIUS2CS was the dependent variable, while PN was the independent variable in the first regression and PF was the independent variable in the second regression (see Table 2 for the regression parameters). Prior to analysis, GPIUS2CS was normalized using a square root transformation. Results indicated that both PN ($F(1,147)=16.40$, $p<.001$) and PF ($F(1,147)=8.78$, $p<.01$) are significant predictors of PIU. PN accounted for 9% of the GPIUS2CS variance while PF accounted for 5% of the GPIUS2CS variance.

Table 2 – Regression parameters for GPIUS2CS.

Dependent variable	Adjusted R^2	Predictor	B	Standardized B	t	p
GPIUS2CS	.09	PN	.02	.32	4.05	<.001
GPIUS2CS	.05	PF	.02	.24	2.96	<.01

4.2. Relations between PN, PF and the GPIUS2 subscales

4.2.1. Zero order correlations

To further understand the relationships of PN and PF with PIU, we assessed the possible associations with the GPIUS2 subscales using Kendall's rank correlation coefficient. The results were then converted to Pearson's r following Walker (2003) (Table 3). Zero-order correlations showed that PN is moderately correlated with POSI; PN and PF are moderately correlated with MR; PF is weakly correlated with CP; PN is weakly correlated with CIU and NO.

The GPIUS2 subscales were then correlated with age and gender. Results show that age correlated weakly and negatively with CIU (τ=-.15, r=-.23, p <.05), while gender correlated moderately and positively with MR (τ=.26, r=.40, p <.001): women (M=15.59, SD=4.99) scored higher on MR than men (M=12.24, SD=5.26).

Table 3 – Converted Pearson correlations (from rank order correlations) between PN, PF and GPIUS2CS subscales.

	PN	PF
POSI (M=9.04, SD=4.80)	.35***	.17
MR (M=13.81, SD=5.39)	.40***	.29**
CP (M=9.32, SD=5.03)	.14	.22*
CIU (M=10.20, SD=5.27)	.20*	.14
NO (M=6.03, SD=4.41)	.25**	.09

Note: n=149, * p < .05. ** p < .01. *** p < .001.

4.2.2. Linear regressions

The zero-order correlations in Table 3 indicate that PN and PF are correlated with GPIUS2 subscales. We further analyzed these relationships with linear regressions (Table 4). Moreover, we carried out multiple regressions (Table 4) when significant age and gender correlations were found with GPIUS2 subscales. Prior to each analysis, data were subjected to the Kolmogorov-Smirnov test which revealed a deviation from normality for all GPIUS2 subscales. Data were then transformed with a square root transformation to make the distributions normal or near-normal and to satisfy the linear or multiple regression assumptions. The linear regression involving PN and NO is not reported because two underlying assumptions were violated. Results indicated that PN is a predictor of POSI ($F(1,147)=15.87$, $p<.001$); PN and gender are predictors of MR ($F(2,146)=18.34$, $p<.001$); PF and gender are predictors of MR ($F(2,146)=13.27$, $p<.001$); PF is a predictor of CP ($F(1,147)=6.09$, $p<.05$); PN and age are predictors of CIU ($F(2,146)=6.21$, $p<.01$).

Table 4 – Regression parameters for GPIUS2 subscales.

Dependent variable	Adjusted R^2	Predictor	B	Standardized B	t	p
POSI	.09	PN	.14	.31	3.98	<.001
MR	.19	PN Gender	.87 1.08	.32 .29	4.32 3.86	<.001 <.001
MR	.14	PF Gender	.80 1.09	.24 .29	3.08 3.78	<.01 <.001
CP *	.03	PF	.01	.20	2.47	<.05
CIU	.07	PN Age	.04 -.01	.16 -.21	2.00 -2.59	<.05 <.05

* The Kolmogorov-Smirnov test revealed a slight deviation from normality for residuals distribution (p=.02).

5. Discussion and Conclusions

The purpose of the present study was to examine the possible relationship between time perspective and problematic Internet use. The results obtained with a sample of Facebook users met our hypothesis: the PN and PF time frames were found to be correlated with PIU. Moreover, two regression analysis pointed out that PN and PF are predictors of PIU.

The current study showed that TP is an individual difference that plays a significant role in PIU, in particular for people who have a PN or PF orientation. Individuals with such orientations might be more willing to use the Internet to alleviate their negative moods than individuals with a different time orientation: in particular, when correlating TP with the GPIUS2 subscales, the larger correlation value was obtained between PN and MR. Further analysis showed also that women had higher values on the MR subscale than men. As suggested by Larsen (2000), women use strategies that rely on social interactions for mood regulation more frequently and successfully than men. The fact that these strategies can rely on the use of the Internet and social networks might contribute to explain the higher MR values for women in the GPIUS2.

The other moderate correlation concerned PN and POSI. Individuals with a high PN value present a potentially disturbing portrait with minimal and unsatisfactory interpersonal relationships (Zimbardo & Boyd, 1999). This might contribute to explain the correlation with POSI: individuals with a past negative orientation could find the Internet to be a safer and better place for social interactions.

Given the negative outcomes that PIU could lead individuals to, in particular adolescents (Hawi, 2012; Moreno et al., 2011), TP should be included in efforts devoted to better understand PIU. Moreover, TP should be considered when studying people use of social

network sites, such as Facebook, considering that they could contribute to PIU (Kittinger, Correia, & Irons, 2012). More generally, the findings of this paper provide additional support to the usefulness of TP in predicting problematic behaviors.

The main limitation of the present study is its correlational nature and reliance on self-report information. Future studies might consider experimental designs to determine causal relations. For example, one can carry out a longitudinal study of individuals in interventions aimed at treating PIU, by measuring PIU and ZTPI at the beginning and at the end of the treatment. In this way, one can assess whether manipulating the level of PIU in an individual results in a change of ZTPI measures or not.

It must also be noted that the present study assessed only the association between TP and PIU. To further investigate their relationship, the existence and role of possible mediating variables should be considered. For example, both PN and PF have been related to anxiety (Zimbardo & Boyd, 1999), which has been related to PIU (Caplan, 2005; Caplan, 2007; Caplan, 2010; Spada, Langston, Nikcevic, & Moneta, 2008). In particular, Caplan (2007) found that anxious people are more likely to prefer on-line social interaction (POSI) than traditional face-to-face activities. Also, he found that socially anxious individuals might prefer online interaction, because it represents a way to mitigate their anxiety about self-presentation in interpersonal situations (i.e. MR). Thus, anxiety could be a mediating variable in the relationship between TP and PIU. Future studies should also consider to include other variables which have already found to be correlated with PIU, such as depression (Ybarra, Alexander, & Mitchell, 2005; Young & Rogers, 1998), locus of control (Chak & Leung 2004), loneliness (Ceyhan & Ceyhan, 2008; Morahan-Martin & Schumacher, 2003), social network usage (Kittinger et al., 2012) and personality traits such as extraversion or neuroticism (Ebeling-Witte, Frank, & Lester, 2007). To give a deeper characterization of the study sample and gain additional

insight into Internet use, variables such as the amount of time that users spend on-line and the motivations that lead them to use the Internet could be considered.

Another limitation of the current study concerns the fact that it was carried out with Italian participants only. For this reason, the results might not be generalizable to other cultures. Further studies might consider investigating the relationship between TP and PIU across cultural contexts. Finally, the study involved only Facebook users. Although Facebook, with its 1.11 billion active users (Facebook, 2013), represents a large part of the estimated 2.78 billion Internet users (International Telecommunications Unions, 2013), it would be interesting to extend the study to Internet users who are not on the social network.

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