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Modeling Facebook users' behavior towards the use of pages related to healthy diet and sport activities

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Abstract:

Purpose: In this article we aim to model social media users' behavior in relation with the use of specified Facebook pages and groups, related to eHealth, specifically to healthy diet and sport activities. The study represents to the best of our knowledge the first region-focused on a specific geographical area research.

Methods: The users' personality is measured through the well-known Big Five model and the behavior is predicted with the Theory of Planned Behavior (TPB). Structural Equation Modeling is used in order to statistically control the associations among the diverse observed and latent variables.

Results: The results suggest an extended theory of planned behavior in combination with personality traits, on eHealth field. Openness and Extraversion do not seem to have positive effect on Attitude. Users' attitude can be affected positively from Agreeableness and Subjective Norms, guiding to finally positive affection of users' actual behavior. Agreeableness cannot influence behavior, directly, nor through SN, since the hypothesis path A-SN is not verified, but it can through Attitude. Neuroticism was negatively correlated to PBC but this hypothesis was not, also, confirmed in the proposed model.

Implications: While literature confirms all of our hypotheses, in our study only 8 in 12 are finally confirmed. The difference between the present model and literature findings can be located on the different cultural dimensions among the different studies. The present survey is focused on the Greek region with all the participants to be Greeks. This location-based limitation could be surpassed by conducting the same research on different geographical regions and then confront the outcomes.

Keywords: Big Five Personality Model, Personality traits, Facebook, Theory of Planned Behavior

JEL Classification: C31, O35, L86

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1 INTRODUCTION

Internet has a major impact on social life with the self-presentation need or the need to belong to be important (Nadkarni & Hofmann, 2012; Seidman, 2013). Nowadays, human interaction through social media platforms is rapidly increasing, providing researchers the opportunity to understand human behavior exploiting the rich information available in social media (Carpenter, Green, & LaFlam, 2011; Krakover & Corsale, 2021).

Facebook counts more than 1.71 billion monthly active users worldwide, as of July 2018 (Samy, 2016; Marengo, Poletti, & Settanni, 2020; Önder, Gunter, & Gindl, 2020). According to Facebook, 757 million users log on Facebook daily with half of them having more than 200 friends (Sedghi, 2014). Facebook has become a useful tool not only for daily friendship interaction but also for seeking information, jobs and advertising medium. Extant research suggests that there is an association between Facebook activity data and personality, demonstrating a relationship between users' online and offline activities. This indicates that users'

personality can be extracted from their Facebook activity (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Marengo et al., 2020). Facebook profiles reflect actual personality and not just a self-idealization and therefore it is suggested that people use Facebook to communicate their real personality and accurate personal profiles (Amichai-Hamburger & Vinitzky, 2010; Garcia & Sikström, 2014). As a result, it can be claimed that Facebook users do not try to misrepresent their profiles but on the contrary, Facebook profiles represent the true personality of a person. Given the multidisciplinary nature of the field, many researchers use theories from behavioral intention in order to better understand individuals who use specific features of social media. Diffusion of Innovation (DOI), Theory of Reasoned Actions (TRA), Technology of Acceptance Model (TAM) and Theory of Planned Behavior (TPB) are the main theories used by academics and researchers. In this research the TPB model is used for two main reasons: TPB has been widely used for health behavior predictions. Furthermore, the addition of the Big Five model as extra variables on TPB provides a more comprehensive theoretical perspective of the user's acceptance and final behavior in the context of eHealth features of Facebook (Gretzel et al., 2012; Branley & Covey, 2018). TPB derives from TRA and it was first developed by Ajzen (1985). In TPB the performance of a person's particular behavior can be predicted by three variables: the attitude of a person towards the behavior (ATT), the subjective norms (SN) and the perceived behavioral control (PBC). These three variables lead to the Intention towards a specific behavior (I), affecting finally the individual's actual behavior.

The present study associates known personality traits with consumers' planned behavior. Both Big Five and TPB are previously used in literature individually or in combination. The combination, though of the two models in the field of eHealth has never tested or used before. The current literature present a gap, to the best of our knowledge. Most of the variables used have been examined previously, separately but not as a unique conceptual model. Furthermore, the article's questionnaire is used for the first time. It is also conducted for the first time in Greece. This two aspects - the combination of the models applied in the eHealth field and the localization of the research - cover the existing gap, not only of the theoretical framework but also the practical implication.

The aim of this study is to model social media users' behavior with regard to the use of specified Facebook pages and groups, related to eHealth, specifically to healthy diet and sport activities. Furthermore, this study will be region-focused on a specific geographical area that has never been used for the aforementioned scope. In order to model this behavior, theories and tools from a variety of disciplines will be used.

The present article contributes to multiple aspects: First a theoretical and conceptual model is developed, examining the effects on individuals' behavior towards healthy diet and sport activities in combination to Facebook pages and groups.. The results will be confronted with other research and outcomes in order to examine the concurrence and consistency with different geographical regions. Finally, the article combines theories and models from different fields, paving the ground to future multidisciplinary research.

The paper is organized as follows: In the next section the literature review is presented. Furthermore, the constructs, included in the theoretical model, are explained. Big Five and TPB are thoroughly analyzed. Next paragraph presents the methodology used, following by and the research results. Finally, the last part includes a discussion on the outcomes as well as limitations of the research and future research implications.

2 LITERATURE

The research was conducted using questionnaires, in order to examine the factors that affect users' behavior towards the adoption of healthy eating/ sports tips suggested by various pages/ groups on Facebook. Many theories are used to explain the online behavior of users in combination with their personality (Gosling et al., 2011; Hall & Pennington, 2013; John, Naumann, & Soto, 2008; Daskalaki et al, 2020; Jspeert & Hernandez-Maskivker, 2020).

One of them, the Five-Factor Model of personality (FFM), known as Big Five, represents the most commonly used model for researching and examining the relationships between personality traits and online users. This taxonomy is one of the most reliable methods for exporting and monitoring personalities (McCrae & John, 1992; Moore & McElroy, 2012; Ryan & Xenos, 2011; Tan, 2012; Zywicka & Danowski, 2008; Misirlis et al, 2018). Big Five is based on the notion that users' personality can be ranked on a five axes model. Every axis represents a specific factor from: Openness to experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism. The aforementioned variables present the first set of our observed set of items.

In literature, each one of the five factors has been examined, showing associations with the way users interact on social media. Furthermore, several of the measurable activities on social media are believed to be influenced by each of the five factor model, negatively or positively. Some of them indicate which personalities use Facebook under certain conditions (Sigala & Christou, 2006; Carpenter et al., 2011; Correa, Hinsley & de Zúñiga, 2010; Moore & McElroy, 2012; Ryan & Xenos, 2011; Błachnio, Przepiorka & Rudnicka, 2016; J.-E. R. Lee, Moore, Park & Park, 2012; Orosz, Tóth-Király & Bőthe, 2015; Skues, Williams & Wise, 2012; Wilson, Fornasier & White, 2010; Bachrach, Kosinski, Graepel, Kohli & Stillwell, 2012; Čukić & Bates, 2014; Chatzigeorgiou & Christou, 2019, 2020; Del Chiappa et al., 2021; Fotiadis, 2018; Fotiadis & Williams, 2018). Together with the Personality trait models, behavioral models are used in order to analyze users' behavior. TBP is a theory that explains individuals' behavior. Basic concept of TBP is the fact that every individual has the intention of particular behaviors. These behaviors are determined by attitude (ATT), subjective norms (SN) and perceived behavioral control (PBC) (Şahin, Karadağ, & Tuncer, 2019).

Attitude is defined as a person's demeanor towards a behavior that shapes the individual's behavioral intention and actual behavior. Ajzen (1985) proposed that attitude is the main factor that develops the intention of using something. Thus, we propose the following hypotheses, regarding the association between ATT and diverse Big Five's personality traits as well as between ATT and TPB concepts:

Hypothesis #1: There is a positive correlation between Openness and Attitude towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #2: There is a positive correlation between Extraversion and Attitude towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #3: There is a positive correlation between Agreeableness and Attitude towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #4: There is a positive correlation between Attitude and Intention towards the use of Facebook pages related to healthy diet and sport activities.

Subjective Norms refer to individuals' awareness of social influence from their narrow social circle to follow or not to follow a certain behavior (Ajzen, 1991). Ajzen's assumption was that individuals tend to behave in such a way as to be accepted by their important referents. Godin and Kok (1996) and Hagger, Chatzisarantis, and Biddle (2002) studied SN in relation to ATT and PBC, finding that SN is a weaker predictor for the Intention, with respect to ATT and PBC. Lo, McKercher, Lo, Cheung, and Law (2011) found that SN, regarding Facebook users in specific, positively influence the intention to perform a certain behavior. Bozionelos and Bennett (1999); Devaraj, Easley, and Crant (2008); Hampson, Andrews, and Barckley (2007); Christou (2010); Marino et al. (2016) analyze and correlate the TPB or the use of social media with users' personalities as predictors for exercise. In these studies, research indicates that extraversion and agreeableness are two of the traits that are positively associated with subjective norms, something that enforces our hypotheses 5 and 6.

Thus, we hypothesize the following positive relationship between SN and Big Five's personality traits as well as between SN and TPB components:

Hypothesis #5: There is a positive correlation between Extraversion and Subjective Norms towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #6: There is a positive correlation between Agreeableness and Subjective Norms towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #7: There is a positive correlation between Subjective Norms and Intention towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #8: There is a positive correlation between Subjective Norms and Attitude towards the use of Facebook pages related to healthy diet and sport activities.

PBC refers to the amount of the control individuals possess on specific behaviors. In other words, PBC explains how easy or difficult it is for a person to perform a certain behavior. Individuals without control over behavioral intentions tend not to perform the behavior, eventually (Trafimow et al., 2002; Mugobi & Mlozi, 2021; Nechoud et al., 2021). Rosen and Kluepfer (2008) associate positively, extraversion and conscientiousness with PBC and negatively neuroticism and PBC. In specific, neuroticism represents a rather doubled-featured trait, since some authors associate neuroticism positively with Facebook usage (Correa et al., 2010; Mehdizadeh, 2010) but others, negatively (Amichai-Hamburger & Vinitzky, 2010). Furthermore, Al-Debei, Al-Lozi, and Papazafeiropoulou (2013) assert that experienced Facebook users tend to use the platform more frequently due to their abilities and that they will continue participating on

Facebook, leading to a higher intention to continue carrying out the behaviors. Next we present the hypotheses formulated regarding PBC and Big Five and TPB:

Hypothesis #9: There is a positive correlation between Conscientiousness and Perceived Behavioral Control towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #10: There is a positive correlation between Extraversion and Perceived Behavioral Control towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #11: There is a negative correlation between Neuroticism and Perceived Behavioral Control towards the use of Facebook pages related to healthy diet and sport activities.

Hypothesis #12: There is a positive correlation between Perceived Behavioral Control and Intention towards the use of Facebook pages related to healthy diet and sport activities.

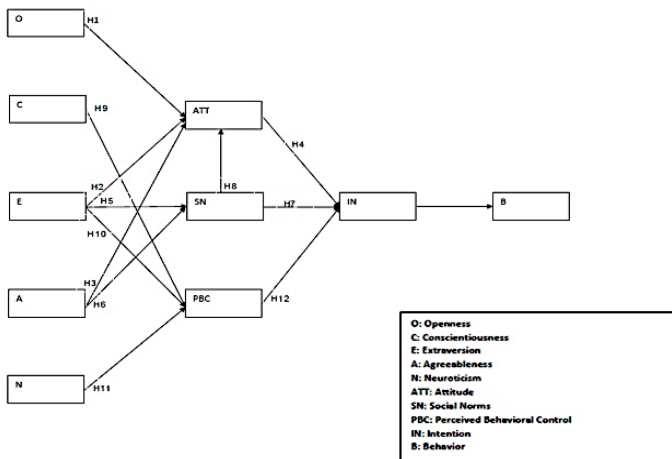
Table 1: The conceptual definitions of the research

Research Variables	Conceptual description	References
Openness (O)	Openness measures peoples' originality and open-mindedness. Openness to new experiences describes how original or complex an individual is in his life	Cukic and Bates (2014) D.-H. Choi and Shin (2017); Liu and Campbell (2017)
Conscientiousness (C)	Conscientiousness measures the constraint and the control of impulse. Such impulses are thinking before acting, delaying gratification, following rules and being organized	J. Choi and Kim (2014); Nadkarni and Hofmann (2012); Seidman (2014)
Extraversion (E)	Extraversion measures a person's energy and enthusiasm. Extravert individuals usually have positive way of thinking	Augustine and Hemenover (2008)
Agreeableness (A)	Agreeableness measures a person's altruism and affection. Agreeableness may also refer to individuals who seek information on internet	J. Choi and Kim (2014); Nadkarni and Hofmann (2012); Seidman (2013)
Neuroticism (N)	Neuroticism measures a person's negative emotionality and nervousness. Neurotic individuals often hide some aspects of themselves, but they show them only online	John et al. (2008); Smith, Saklofske, and Nordstokke (2014) Seidman (2013)
Attitude (ATT)	A person's attitude towards a specific behavior, that shapes the individual's behavioral intention and actual behavior	Al-Debei et al. (2013); Chang and Chen (2014); Chu and Chen (2016); Hajli, Shanmugam, Powell, and Love (2015); Ozkan and Kanat (2011); Pi, Chou, and Liao (2013)
Subjective Norms (SN)	An individual's perception about a particular behavior, which is influenced by the judgment of significant others (parents, spouse, close friends, teachers)	Al-Debei et al. (2013); Amjad and Wood (2009); Chang and Chen (2014); Chu and Chen (2016); Hajli et al. (2015); S.-Y. Lee, Hansen, and Lee (2016); Ozkan and Kanat (2011); Pi et al. (2013)
Perceived Behavioral Control (PBC)	An individual's perceived ease (or difficulty) of performing a particular behavior. PBC is determined by the total set of accessible control beliefs. In general PBC adds to the effort a person will apply to a behavior. It is an independent variable that determines behavior as attitude and subjective norms remain constant	Al-Debei et al. (2013); Armitage (2005); Chang and Chen (2014); Chu and Chen (2016); Hajli et al. (2015); Ozkan and Kanat (2011); Pi et al. (2013)
Intention (IN)	An indication of an individual's readiness to perform a given behavior. It is assumed to be an immediate antecedent of behavior. It is based on attitude towards the behavior, SN and PBC, with each predictor weighted for its importance in relation to the behavior and population of interest	Ahmad et al. (2014); Ajzen (2002); Bozionelos and Bennett (1999)
Behavior (B)	An individual's observable response in a given situation with respect to a given target. A behavior is a function of compatible intentions and perceptions of behavioral control, in that perceived behavioral control is expected to moderate the effect of intention on behavior, such that a favorable intention produces the behavior only when perceived behavioral control is strong	Ajzen (1991, 2002)

Despite the plethora of articles for various alternations of usages and associations, there is a lack of research in literature regarding Big Five and Facebook usage related to healthy eating or sports tips that are suggested by various pages/ group. Furthermore, there is no research, to the best of our knowledge that combines Big Five, Facebook, eHealth and the TPB together in one unified model. The originality of this article consists of correlating TPB and personality traits on the field of eHealth, in specific healthy eating or sports tips that are suggested by various pages/ group on Facebook. The unified proposed model is tested statistically with Structural Equation Modeling (SEM), using AMOS SPSS 18. Table (1) summarizes the conceptual description for each research variable used in the research with the relevant literature. Depending on each hypothesis formulated, these variables are divided in dependent or independent.

Figure 1 shows the conceptual model, based on the literature review and the association among the diverse components of the model, indexed with the relevant hypothesis.

Figure 1: Initial Conceptual Model



3 METHODOLOGY AND RESULTS

3.1. Operationalization of variables

Table 2 (Appendix) indicates the operational definitions of the study instruments. Each variable is measured through diverse items based on a 5-point Likert scale, ranking from 1 (completely disagree) to 5 (completely agree). An extended 24-item Big Five Personality Trait Inventory was used for Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. After reviewing the relevant literature, a 14-item inventory for TPB was created, customized for providing information about the adoption of healthy eating or sports tips suggested by various pages/ groups on Facebook.

3.2. Data collection and sample characteristics

A questionnaire was distributed online on 750 Facebook users, via e-mail, Facebook and LinkedIn posts and personal messages. Answers were collected for a 6-month period, specifically from May 2018 to November 2018. We conducted a pilot collection of answers (n=40) in order to identify any misunderstandings and lacks of clarity and accuracy. 578 users responded the questionnaire completely, obtaining a response rate equal to 77%. Table 3 presents the demographic profile of the participants. Sex is equally distributed. The vast majority belongs to the 18-24 age range (76.8%), making the research even more targeted of specific age groups. Considering that the range 18-27 occupies the 87.7% of the total sample, we can extract hyper focused outcomes regarding the aforementioned age decade. An ample majority of the respondents are undergraduate students (82%), living in big cities and urban areas (82.7%).

Table 3: Demographic characteristics of the participants

Demographics		Frequency	Percent
Gender	Male	286	49.5%
	Female	292	50.5%
Age	18-21	288	49.8%
	22-24	156	27.0%
	25-27	63	10.9%
	28-30	37	6.4%
	30+	34	5.9%
Education	UG student	474	82%
	PG student	97	16.8%
	PhD candidate	5	0.9%
	PhD+ education	2	0.3%
Residence	Urban area	478	82.7%
	Suburban area	72	12.5%
	Rural area	28	5.8%

It is also interesting to present the most used social media platforms (Table 4). The top three social media in the list, with a significant difference from the fourth, are: Facebook, where the overwhelming 99.3% has an active account, Instagram with 72% active users from our sample and Twitter with 41.2% of the participants responding to possess an active account. An important finding is that even in times of great economic crisis in the country where the research was conducted; only 3.3% of respondents have an account on the largest professional social medium, to wit, LinkedIn, something logical, taken into consideration the respondents' age. Table 4 presents the percentage of users with active accounts, among our sample.

Table 4: Social media platforms with active accounts

Platform	Frequency	Percent
Facebook	574	99.3%
Instagram	416	72%
Twitter	238	41.2%
LinkedIn	19	3.3%
Pinterest	11	1.9%
Viber	6	1%
Snapchat	5	<1%
YouTube channel	4	<1%
Reddit	2	<1%
Tumblr	1	<1%
Github	1	<1%
Tinder	1	<1%
Discord	1	<1%

3.3. Data analysis and results

The proposed model with the hypotheses was tested with Structural Equation Modeling (SEM), using maximum likelihood estimation. The techniques SEM uses, examine the covariance structure and the relationships between and among latent variables, including the effects of direct, indirect, reciprocal and misleading causal relationships. A main difference between SEM and other similar models is that SEM assumes that variables cannot be measured with precision, so it includes an error on its measurements. Two models are created in SEM, the measurement and the structural. The first one represents the construction on the measured variables, while the structural model presents the various associations between constructs. The measurement model proves that the latent variables measured the intended constructs. This technique is known as the Confirmatory Factor Analysis (CFA). CFA verifies the factor structure of the set of our observed variables. With CFA researchers can assume that a relationship between observed variables and their underlying latent constructs exists. After the CFA technique application, we confirmed that all constructs meet the measurement standards. This confirmation leads to the second test of the structural model in order to investigate the relationships among the theoretical constructs, thus confirming or not, the hypotheses model. Final purpose in order to confirm the theoretical model is an insignificant difference between measurement and structural model. SPSS 21 and SPSS AMOS 21 were used in this study to determine measurement and structural models.

3.4. Measurement model

The constructs are represented by the measured variables of our model. In order to test the measurement model, CFA was used. The model used 38 items that describe the 10 latent constructs, analytically: Openness (O), Conscientiousness

(C), Extraversion (E), Agreeableness (A), Neuroticism (N), Attitude (ATT), Subjective Norms (SN), Perceived Behavioral Control (PBC), Intention to use (IN) and Behavior (B). Su and Chan (2017) recommend a list of fit indices from different classes, such as absolute fit, incremental fit and comparative fit. The following combination of fit measures was used: $\chi^2/d.f.$, non-norm fit index (NNFI), the root mean square error of approximation (RMSEA), the adjusted goodness of fit index (AGFI), the goodness of fit index (GFI), the comparative fit index (CFI) and the root mean square residual (RMR). For every index a threshold is given, together with the model's data, to set the goodness of fit. As it is shown on Table 5, the proposed model fits well with the data collected. As a result, reliability and validity (convergent and discriminant) could be calculated and evaluated.

Table 5: The model's fit indices

Fit Indices	Recommended value	Measurement model	Structural model
$\chi^2/d.f.$	≤ 3.00	2.17	2.16
NNFI	≥ 0.90	0.96	0.96
RMSEA	≤ 0.09	0.050	0.049
AGFI	≥ 0.80	0.90	0.88
GFI	≥ 0.90	0.91	0.91
CFI	≥ 0.90	0.96	.996
RMR	≤ 0.05	0.049	0.049

The internal consistency was estimated through the Construct Reliability (CR) on Table 6, together with the Average Variance Extracted (AVE). CR is greater than 0.7, or close to 0.7 in only two cases, rendering all variables acceptable, and indicating also high internal consistency.

Table 6: Construct Reliability (CR) and Average Variance Extracted (AVE)

Variable	CR	AVE
Extraversion	0.761	0.51
Agreeableness	0.780	0.49
Conscientiousness	0.789	0.55
Neuroticism	0.614	0.57
Openness	0.710	0.59
Attitude	0.787	0.55
Subjective Norms	0.821	0.60
Perceived Behavioral Control	0.669	0.49
Intention	0.735	0.53
Behavior	0.829	0.70

Table 7: Discriminant Validity

Variables	1	2	3	4	5	6	7	8	9	10
E	1.000									
A	.270	1.000								
C	.088	.155	1.000							
N	.018	.122	.036	1.000						
O	.263	.223	.247	.061	1.000					
ATT	.060	.025	.092	.122	.007	1.000				
SN	.175	.104	.036	.117	.083	.516	1.000			
PBC	.033	.155	.212	-.010	.107	.476	.382	1.000		
I	.125	.127	.094	.056	.063	.587	.401	.428	1.000	
B	.133	.070	.044	.002	.039	.554	.362	.419	.545	1.000

AVE's lowest value is 0.49 for Agreeableness and PBC, all values though are greater than the squared correlation estimates on Table 7 (see the values below the diagonal). As a result, the test does not show problems with the discriminant validity and no new path was included in order to improve the fit of the model, therefore, next paragraph analyzes the results of our structural model.

3.5. Structural model

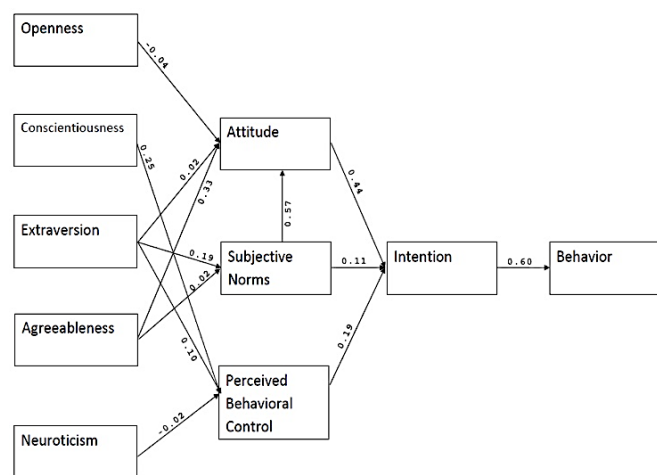
The next step consists of estimating the structural model in order to empirically measure the relationships among variables and constructs. The structural model presented similar estimates to the measurement model, suggesting an overall good model fit. Table 8 presents the coefficients for each hypothesis and the t-value calculation based on Bonsón and Flores (2011), posing the t-critical cutoff on 1.69. By these measurements, 4 hypotheses are not significant (H1, H2, H6, H11). In conclusion, given that 8 out of 12 estimates are consistent with the initial hypotheses, the results support the theoretical model, therefore, our SEM model (Figure 2), explains the data equally well with the CFA model. Analytically, the first hypothesis that is not confirmed is H1 (H1; $\beta = -0.04$; $t = -0.96$; $p > 0.05$), meaning that it is not confirmed the fact that there is a positive correlation between Openness and Attitude towards the use of Facebook pages related to healthy diet and sport activities, on our model and on our sample. Non confirmation we obtain also from the H2, H6 and H11 hypotheses, related to Extraversions and Attitude (H2; $\beta = -0.02$; $t = -0.48$; $p > 0.05$), Agreeableness and Subjective Norm (H6; $\beta = 0.02$; $t = 0.48$; $p > 0.05$), and Neuroticism and Perceived Behavioral Control (H11; $\beta = -0.02$; $t = -0.48$; $p > 0.05$), respectively.

On the other side 8 hypotheses of our initial model are confirmed. Immediate positive correlations from the Big Five to TPB factors were expected such as the Conscientiousness to PBC (H9; $\beta = 0.25$; $t = 6.23$; $p < 0.05$), the Extraversion to Subjective Norm and PBC (H5; $\beta = 0.19$; $t = 4.67$; $p < 0.05$, H10; $\beta = 0.10$; $t = 2.42$; $p < 0.05$) and the Agreeableness to Attitude (H3; $\beta = 0.33$; $t = 8.43$; $p < 0.01$). Furthermore, Attitude and Subjective norm were found to have a strong positive impact on intention to behavior (H4; $\beta = 0.44$; $t = 11.8$; $p < 0.01$, H7; $\beta = 0.11$; $t = 2.67$; $p < 0.05$), supporting our hypotheses. PBC was found to have positive impact on intention to behavior (H12; $\beta = 0.19$; $t = 4.67$; $p < 0.05$). Last, but not least, a very strong positive impact is noted on Subjective norm to Attitude (H8; $\beta = 0.57$; $t = 16.73$; $p < 0.01$). This last correlation is the only one between internal factors of the same model, in this case TPB.

Table 8: Hypotheses' paths, coefficients and t-values

Hypothesis	Path	Coefficient	t-value	p-value
H1	O→ATT	-0.04	-0.96	> 0.05
H2	E→ATT	-0.02	-0.48	> 0.05
H3	A→ATT	0.33	8.43	< 0.01
H4	ATT→IN	0.44	11.8	< 0.01
H5	E→SN	0.19	4.67	< 0.05
H6	A→SN	0.02	0.48	> 0.05
H7	SN→IN	0.11	2.67	< 0.05
H8	SN→ATT	0.57	16.73	< 0.01
H9	C→PBC	0.25	6.23	< 0.05
H10	E→PBC	0.10	2.42	< 0.05
H11	N→PBC	-0.02	-0.48	> 0.05
H12	PBC→IN	0.19	4.67	< 0.05

Figure 2: SEM results for the proposed model



4 THEORETICAL AND MANAGERIAL IMPLICATIONS

The results of the proposed model suggest an extended theory of planned behavior in combination with personality traits, on eHealth field. Two thirds (8 in 12) of the hypotheses are verified, in the proposed model. Openness and Extraversion do not seem to have positive effect on Attitude. On the other side, users' attitude can be affected positively from Agreeableness and Subjective Norms, guiding to finally positive affection of users' actual behavior. Agreeableness cannot influence behavior, directly, nor through SN, since the hypothesis path A->SN is not verified, but it can through Attitude. Neuroticism was negatively correlated to PBC but this hypothesis was not confirmed in the proposed model, either. In general, the personality traits of Big Five are not considered individually but in combination with one another. So it's not very important that one trait does not affect a construct of the TPB, because there will be another one that does it. For example, individuals with elevate Extraversion and Agreeableness will affect their Attitude, if not directly from the extraversion, then agreeableness.

From the proposed model it derives that Intention to behavior, and therefore behavior, are affected directly by ATT and PBC. Even if the study found that SN influence less the intention to use Facebook groups and pages related to healthy diet and sport activities, this can be done through ATT, considering the path SN->ATT->IN. Furthermore, conscientiousness via PBC and agreeableness via ATT can affect more the intention to use, and therefore the final behavior of usage. TPB literature can be contributed strongly to the verification of the hypotheses of our mode, as well as social science. Regarding the negative coefficients of our hypotheses (O->ATT, E->ATT, A->SN and N->PBC) even if they are not verified, useful outcomes can be extracted. Neurotic users for example tend to use a lot the social media platforms. Even though, theory implies that neurotics are quick and nervous. The other three hypotheses that were not verified, present a unique characteristic. All three hold a value of p, slightly greater than 0.5. We cannot accept them, but the theory implies that if such hypotheses run again in another environment or time, outcomes might be different.

The conclusions of the present study can contribute to practitioners by helping them assess their marketing decisions based on the knowledge of which combination of personalities and planned behavior influence more the use of social media pages and groups related to healthy diet and sport activities. Companies involved in such activities can modify their strategies in order to communicate their products to a wider audience, maximizing awareness and engagement. Furthermore, international brands can take into consideration that the Greek market presents particularities that maybe other regions do not, altering, thus, their planning and approaches.

4.1. Limitations and future implications

While literature confirms all of our hypotheses, in our study only 8 in 12 are finally confirmed. The difference between the present model and literature findings can be located on the different cultural dimensions among the different studies. The present survey is focused on the Greek region with all the participants being young Greek students. A repetitive research in other countries and/ or different age groups, taking into consideration the cultural differences and dimensions can lead to interesting outcomes. This way, the location-based limitation could be surpassed. The same implies for applying this research in other than eHealth areas. Furthermore, considering a wider sample from the same region could add to the research with a more depictive view of the social media services penetration.

5 NOTE

Parts of the present article, especially the statistical analysis and the theoretical framework, make part of the first author's doctoral dissertation and therefore can be found on first author's affiliation's repository (University of Macedonia, Thessaloniki, Greece) for doctoral dissertations.

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Appendix 1

Table 2: The operational definitions of the research variables

Research Variables	Operational Definitions
Openness (O)	O1. I use a rich vocabulary O2. I have a vivid imagination O3. I often have great new ideas O4. I can easily understand difficult and new concepts
Conscientiousness (C)	C1. I am always prepared C2. I look at the details C3. I never leave pending C4. I like the order in my stuff C5. I always follow a program C6. I am demanding in my work
Extraversion (E)	E1. I am always the focus of interest in a celebration E2. I feel comfortable between people E3. I always start a conversation first E4. I usually talk to many people (e.g. at a party) E5. I do not mind being at the center of attention
Agreeableness (A)	A1. I am interested in the problems of others A2. I am interested for people's problems A3. I am a sensitive person A4. I enjoy my spare time for others A5. I understand the feelings of others A6. I make them around me feeling comfortable
Neuroticism (N)	N1. I rarely feel despondent and sad N2. I never get anxious N3. I am high tempered person
Attitude (ATT)	ATT1. I find it a good idea to follow healthy eating or sports tips that suggest various pages / groups on Facebook. ATT2. I would feel enjoyable if I follow healthy eating or sports tips that suggest various pages / groups on Facebook. ATT3. I would be very helpful to follow healthy eating or sports tips that suggest various pages / groups on Facebook.
Subjective Norms (SN)	SN1. Most of my friends think I should be following healthy eating or sports tips that suggest different pages / groups on Facebook. SN2. People who are important to me consider that I should follow healthy eating or sports tips that suggest different pages / groups on Facebook. SN3. The people who influence me with their opinions believe that it would be good to follow healthy eating or sports tips that suggest various pages / groups on Facebook.
Perceived Behavioral Control (PBC)	PBC1. I plan carefully the daily schedule so I follow the healthy eating or sports tips suggested by various pages / groups on Facebook. PBC2. If I really want it, it is very easy for me to follow the healthy eating or sports tips suggested by various pages / groups on Facebook. PBC3. It only depends on me if I follow the healthy eating or sports tips that suggest various pages / groups on Facebook.
Intention (IN)	IN1. If I have already used such tips, I intend to reuse. IN2. I believe that in the future I will use Facebook pages that offer tips for healthy eating or sports. IN3. I'm aiming to visit Facebook pages that offer tips for healthy eating or sports.
Behavior (B)	B1. I already use Facebook pages or other social media that offer tips for healthy eating or sports. B2. I already follow pages on Facebook or other social media that offer tips for healthy eating or sports.

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