PREDICTABILITY OF LEVELS OF PHYSICAL AND MENTAL HEALTH: A 2 YEAR LONGITUDINAL STUDY

Nicolas Zdanowicz, Brice Lepiece, David Tordeurs, Denis Jacques & Christine Reynaert

Université Catholique de Louvain, Clinique de Mont-Godinne, service de psychosomatique, 5530 Yvoir, Belgium

SUMMARY

Objective: To identify the social, family, personality traits and health locus of control factors which influence physical and mental health, consumption of medications, and frequency of medical consultations.

Subjects and Methods Twenty participants were included in a two years long longitudinal study. At baseline, the participants' age, gender, family composition, net income, chronic treatments, family dynamics (Family Adaptation and Cohesion Scale), Multidimensional Health Locus of Control, and personality (NEO Personality Inventory) were recorded. Every six months their state of mental and physical health (12 Survey Factors and Hamilton Depression Scale), consumption of medications, and number of medical consultations were reassessed.

Results: Regarding mental, and physical health, and scores on the Hamilton Depression Scale we can explain 50% of the variance, of which 25% accounts for age or for the number of persons living together, 15% accounts for the cohesion of the actual couple or nuclear family and 10% on account for neuroticism or on the Internal HLC. With regard to the number of medications and consultations only 30% of the variance is accounted for: 10% for gender, 10% for the cohesion of the ideal family and 10% for neuroticism or extraversion.

Conclusion: These results can obviously be used in the field of secondary prevention, for example in raising GPs' awareness to the typical profile of patients who are at risk of mental or physical health problems. Ideally these results should also serve for primary prevention, but how can we influence demographic variables, family cohesion or personality?

Key words: *family – health - personality locus of controle - depression*

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INTRODUCTION

In previous studies Zdanowicz & Reynaert (2004a, b), Zdanowicz et al. (2004), and Zdanowicz & Jacques (2006) compared the links between family dynamics, conception of health, and indicators of health between a group of healthy adolescents, and a group of adolescents presenting with various mental disorders. They used the Olson's model (Family Adaptation and Cohesion Scale FACES III (Olson 1986)) to investigate family dynamics. This model evaluates two dimensions of the functioning of a relational system: cohesion and adaptability. Cohesion is defined as "the emotional ties that every member develops with regard to the others". Adaptability is "the ability of the system to change its power structure, its roles and rules in response to stressful situations". A review about the use of this scale was published by Zdanowicz (2008). In this research the health conception was investigated with Wallston's MHLC (Multidimensional Health Locus of Control) (Wallston et al. 1978). This model explores how people relate to their own health in terms of the role they play in it. While certain individuals think they have a personal role to play to avoid or fight diseases (internal perception of "health locus of control"), others attribute the causes of their health to destiny or "others' influence" (members of the family or health professional). The MHLC distinguishes between three sub-scales: "Internality" (IHLC - Internal Health Locus of Control), "Others' Power" (PHLC - Powerful others

Health Locus of Control), and "Chance" (CHLC - Chance Health Locus of Control).

In the previous study, adolescents' family cohesion and adaptability were both differentiating variables between the two groups but were also showed to be influential in:

- Participants' conceptions of health;
- Changes of these conceptions at different ages.

On the whole the family of origin of healthy adolescents was more adaptable and especially more cohesive. These results correlate with a higher feeling of control over one's health (internality-IHLC) and with a declining propensity to attribute responsibility for one's health to others over time (Power of Others-PHLC). In 2006, in another study Zdanowicz & Reynaert attempted to determine if these variables could predict over 2 years different indicators of health such as, for example, medication consumption. This hypothesis was confirmed only for healthy adolescents. In order to better objectify, and extent these results, we conducted a 2 years longitudinal study that also includes adults, and personality factors in our criteria of health. Twenty healthy participants – ten adolescent and ten adults – were evaluated every six months in terms of their mental and physical health, consumption of medications, and frequency of medical consultations. Intermediate results have been published (Zdanowicz et al. 2010a, b, 2011 in press).

SUBJECTS AND METHODS

Participants

Twenty Caucasian participants (ten between 12 and 18, and ten between 19 and 63) were enlisted after agreement and after giving written consent. The participants' written consent was validated by the Ethics Committee of the Catholic University of Louvain Mount Godinne clinics. The above agreement covers the national territory (Belgium B03920072846). The participants were to be free from any psychiatric disorder on axis I of the DSM IV, and from any physical pathology unless chronic and stable. The sample mean age was 29.14 year (std: 14.62). The youngest subject was 13, and the oldest, 56. The gender ratio was nine females to eleven males. On average, four people (min 1, max 6) lived together (std: 1.5). The average net family income was 2.300€/month (std 830€), the Belgian income average being of 1140€ /months/person.

Measures and procedure

The French version 5.0.0 of the MINI (Lecrubier et al. 1998) (International Mini Neuropsychiatric Interview) was used in order to exclude all psychiatric disorders.

The socio-demographic data collected included age, gender, number of persons living in the same household (family composition), net monthly income (in the case of an adolescent, the cumulated income of his/her parents is divided by 2), and eventual chronic treatment.

The following basic data (independent variables) were also collected at time T_0:

- The cohesion and adaptability of the - nuclear and ideal - family of origin, as well as of the current and ideal couple, assessed with Olson's FACES III (Olson 1986).
- Wallston's Multidimensional Health Locus of Control (MHLC) (Wallston et al. 1978).
- Personality - according to Neo-FFi typology (Costa 1992). This instrument explores five dimensions of personality: neuroticism, extraversion, openness, agreeableness, and conscientiousness. The dimension neuroticism refers to one's emotional stability and adaptability. The more present this dimension, the more the subject feels negative affects such as fear, sadness, anger, guilt, disgust, and embarrassment. Extrovert participants are sociable,

although gregariousness is only one facet of extraversion. Extrovert people prefer large groups, are active, energetic, verbose and optimistic. Open participants are curious of everything that originates in their internal and external universe, and their life is rich in experiences. They typically conceive new ideas, adopt unconventional values, and experience intense positive and negative emotions. Participants who obtain a low grade on the openness dimension tend to be conservative and conventional in their opinions and behaviours. People who score high on agreeableness are altruistic, likable, helpful, and think they are likely to get help in return. People who score low on agreeableness are egocentric, suspicious of others' intention and more likely to compete rather than cooperate. The dimension of consciousness (C) refers to the capacity to manage one's desires. This self-control can lead one to active planning, organizing, and performing tasks. A positive high C score is associated with academic and professional success. A negative C score is correlated with exaggerated and painful requirements, with a compulsive need for order and cleanliness and with work overload.

The following data (dependent variables) were collected at time T_0, and then every six months:
- The level of physical health (physical functioning, physical daily life functioning, physical pain, and general health), and mental functioning (vitality, social functioning, daily mental life functioning and mental health) with SF-12 (Ware & Keller 1996).
- The level of depressive symptoms with Hamilton's 17 items scale (Hamilton 1967).
- Prescribed drug consumption (number of drugs and their classification).
- Medical consumption (number and types of medical consultations (general or specialized medicine, as well as the specialty type)).

Statistics

Parametric statistical methods were used and checked for types 1 and 2 errors. No post-hoc test was realized. Correlations between continuous variables were studied with Pearson's test, controlled for eventual demographic co-variables, and eventually completed with a linear regression. Ms were compared using t-Student test, and Pearson χ^2 as a test of independence.

Table 1. FACES III scores

	Cohesion (std) mean: 40 (min 10 – max 50)	Adaptability (std) mean: 24 (min 10 – max 50)
Family of origin	35 (6.1)	25 (5.2)
Nuclear family (adults only)	39.1 (4.7)	25.3 (5.1)
Current couple (adults only)	39 (6.5)	32.5 (6.1)
Ideal family	41.8 (3.4)	28.5 (7.1)
Ideal Couple	44.7 (3.8)	35.1 (7.8)

RESULTS

Independent variables:
FACES III, MHLC, Neo-FFI

The scores at the FACES III are detailed in table 1.

The MHLC results (min 6 – max 36) show that on average, participants were more "internal" (23.71, std: 4.18), then "others' power" (19.14, std: 4.1), and finally, are lower for the level of "chance" (17.43, std: 4.0).

As for personality, (min 0 - max 60), the dimension "extraversion" was predominant (42.38 std: 4.87), followed by the dimension of "consciousness" , (42.48 std: 8.34), "agreeableness", (41.05 std: 5.84), "openness" (37.62 std: 6.53), and finally, "neuroticism" (32.9 std 8.76).

Dependent variables: physical health, depressiveness, drugs consumption, medical consultation

The average scores on SF12 were of 51.15 (std: 4.72) for physical health (whereas the Belgian average was 52.44 according to the ESEMED study (12)), and 51.51 (std: 10.49) for mental health (the Belgian average being 57.13).

On the Hamilton scale, our sample average of 3.90 (std:3.23) was quite inferior to the limit of 7, which indicates a risk of depression close to nil. Two participants scored respectively 9 and 13.

Two participants take two medications on a chronic basis, and one subject takes only one medication regularly. Medical consultation was defined as nil in the beginning of the research.

Table 2. Evolution of health factors in 2 year

T0 – T2 years	Δ of mean	IC	t	sign
Physical Health	-1.245	-4.377: 1.888	-0.829	0.417
Mental Health	-1.185	-5.640: 3.270	-0.555	0.585
Nbr consultation in 6 month	-0.143	-0.531: 0.246	-0.767	0.452
Hamilton	1.095	-1.620: 3.811	0.841	0.410
Nbr of medication	-0.381	-0.965: 0.203	-1.360	0.189

Globally we can not see any significant statistical differences for any health factor between time 0 and 2 years later (Table 2).

Correlations between demographic and independent variables with health factors

In table 3 we can see all the correlations that have been found every 6 month until 2 years.

Table 3 reveals that one can distinguish two main types of health factor: On the one hand, on the SF12 scores for physical and mental health as well as on the HAMILTON, and on the other hand, the number of consumption of medications, and frequency of medical consultations.

With regard to the scores on SF12 and HAMILTON, at most, 48% of the variance is accounted for of which 25% accounts for social-demographic factors, 15% accounts for the cohesion of the actual couple or nuclear family and 10% is accounted for by Personality factors (Table 4). Regarding mental, and physical health, and scores on the Hamilton we can explain 50% of the variance, of which 25% is accounted for by age or by the number of persons living together, 15% is accounted for by the cohesion of the actual couple or nuclear family and 10% is accounted for by neuroticism or by the Internal HLC. With regard to the number of medications and medical consultations only 30% of the variance is accounted for: 10% for gender, 10% for the cohesion of the ideal family and 10% for neuroticism or extraversion.

DISCUSSION

The results above have drawn our attention to the following observations. First, the subjective variables are more predictable than the objective ones (number of medications and medical consultations). Second, the formula that explains the predictable variance is the same, and in descending order in both cases: the objective parameters such as age, gender, and number of people living together added to cohesion, added personality factors. The observation that age and gender are predominant illustrates the proportional power of biology over other determinants. The effect of the number of people living together is consistent with the numerous medical studies that have shown the importance of social support. Cohesion in a social system is a measure of emotional closeness among members, and recent studies on social support have shown that the quality of relationships was sometimes more important than the number of persons constituting the social support (Dickens et al. 2004). Finally, among the personality factors, emotional instability and maladjustment are the most frequent and noxious factors whereas extraversion, and IHLC are protective.

CONCLUSION

These results can obviously be used in the field of secondary prevention, for example in raising GPs' awareness to the typical profile of patients who are at risk of mental, or physical health problems. Ideally these results should also serve for primary prevention, but how do we influence demographic variables, family cohesion, or personality?

Table 3. Correlations between demographic and independent variables with health factors

T total	dt	Physical H.	Mental H.	Nbr consult.	Hamilton	Nbr medication
Age (p;r)	0		0.05; -0.418			0.042; 0.447
	18		0.001; -0.665		0.005; 0.593	
	24		0.000; -0.699		0.003; 0.623	
Nbr perso (p;r)	0		0.007; 0.573			
	6		0.029; 0.476			
	18		0.005; 0.589		0.006;-0.582	
	24		0.024; 0.490		0.002;-0.631	
Neuroticism (p;r)	0		0.002; -0.637			0.011; -0.545
	6	0.012; -0.537				
	24	0.008; -0.563				
Co of IF (p;r)	0					0.025; -0.487
	24			0.041; -0.45		
Gender (p;t)	0				0.017; 2.606	
	6			0.037; 2.248		
	12					0.044; 2.159
	18			0.043; 2.165		
Co of AC (p;r)	0	0.045; 0.642				
	12	0.045; 0643				
	18		0.005; 0.809			
Extraversion (p;r)	12			0.03; 0.473		
Co of NF (p;r)	6	0.030; 0.682				
	12				0.049; -0.633	
IHLC (p;r)	0				0.019;-0.507	
	12				0.02; -0.517	
Ada of NF (p;r)	6				0.03;- 0.854	
Ada of FO (p;r)	6			0.044; 0.443		
CHLC (p;r)	0					0.039; 0.453
Co of FO (p;r)	0	0.006; 0.581				
Open (p;r)	0	0.016; 0517				
Income (p;r)	0					0.003; 0.616
Ada of IF (p;r)	0	0.05; -0.425				
Ada of AC (p;r)	0				0.038; 0659	

Abbreviations: F: family;   C: couple;   O: Origin;   N: Nuclear;   cu: current;   I: ideal;   co: cohesion;   ada: adaptability;
Phys health: physical health;   Ment health: mental health;   nbr med: number of medications

Table 4. Explained variances

% max of explained variance	=	Demographic	+	Cohesion	+	Personal
48%		24%		14%		10%
Physical Health		-				
Mental Health		Age		Co of AC		Neuroticism
Hamilton		Nbr persons		Co of NF		IHLC
30%		10%		10%		10%
Number medication						Neuroticism
Number consultation		Gender		Co of IF		Extraversion

Abbreviations: F: family;   C: couple;   O: Origin;   N: Nuclear;   I: ideal;   co: cohesion

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Correspondence:

Nicolas Zdanowicz, MD, PhD, Prof.
Université Catholique de Louvain, Psychosomatic unit,
Clinic of Mont-Godinne, 5530 Yvoir, Belgium
E-mail: nicolas.zdanowicz@uclouvain.be