Psychosomatic states and their correlation with fluidity of consciousness related to letting go two newly evaluated core factors for investigating the therapeutic effect of spa treatment

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Abstract

Spa therapy (aka crenobalneotherapy) has been the object of criticism due to insufficient evidence of its effectiveness. While further effectiveness studies are needed, others are also required to better evaluate the curative factors involved during spa therapy that may contribute to the effectiveness. The current study used specific scales to investigate two possible curative factors: the psychosomatic state and the letting go of patients with mental disorders after three weeks of spa therapy. The Saujon Psychosomatic Questionnaire (SPQ) and the Quantified Assessment of Fluidity of Consciousness Questionnaire (QACF) evaluate psychosomatic state and letting go, respectively. The Hospital Anxiety and Depression scale (HAD) and the Insomnia Severity Index (ISI) evaluate depression and anxiety symptoms and insomnia symptoms respectively. Sixty-five subjects (57 women – 87.69%; 8 men), mean age 56.9 (+/- 9.7) years were included. SPQ and QAFC scores improved significantly before and after the three weeks of spa therapy. Improvement in HAD and ISI scores was significantly correlated with SPQ and QACF scores. These preliminary results suggest that the induced psychosomatic state and the letting go induced by spa treatment with bubbling baths, jet showers, pool bathing and massage could help patients to become more available and more able to change their psycho-physiological state.

Introduction

While spa therapy (aka crenobalneotherapy) has been used empirically since time immemorial to treat chronic pathologies, it has suffered from criticism owing to insufficient evidence concerning its effectiveness. However, in recent years, a growing body of evidence has demonstrated its potential effectiveness in a wide range of pathologies. In 2021, PubMed listed 1098 publications on spa therapy versus 155 in 2002, suggesting that the scientific community is committed to evaluating its effectiveness and to establishing the curative factors involved in it.

Mental disorders constitute a particular but poorly known indication for spa therapy. Spa therapy has been shown to be effective in major depressive disorder (MDD), generalized anxiety disorders (GAD), post-traumatic stress disorder (PTSD) and insomnia disorders (Frullani 2012). However, there is a dearth of well controlled international studies on spa therapy in psychiatry. One of the reasons for this is that, unlike pharmacological studies, this type of study is difficult to organize regarding setting up a reliable placebo and appropriate control situation, which would ensure that the curative effect of spa therapy is controlled (Queneau 2000).

To treat mental disorders by spa therapy in France, a consensus of experts has defined four essential features of treatments: a) bubbling baths in complete immersion, at 38° C; b) jet showers at 3 or 4 bars pressure directed at certain parts of the body such as the solar plexus, c) swimming pool baths for a minimum of 10 minutes; and d) massages with natural mineral water affusion for 10 to 20 minutes. Moreover, these spa treatments should be accompanied by psychotherapeutic follow-up (Queneau P, and Roques 2018). With these four types of hydrothermal care, Constant et al. obtained a reduction in Montgomery-Åsberg Depression Rating Scale (MADRS) scores that were confirmed at 6 months,

associated with a reduction in the use of antidepressants, in 78 patients suffering from MDD (Constant et al.1997). In the STOP-TAG study, 237 patients with GAD obtained an additional clinical improvement of 44% with spa therapy compared to paroxetine on the Hamilton Anxiety Scale (Olie et al. 1997; Dubois et al. 2008; Dubois et al. 2019). The SPECTh multicentre study, combining spa treatment with cognitive-behavioural therapies, showed a reduction or cessation of benzodiazepine use in 80% of the 70 patients 6 months after the spa treatment. (Dubois 2013). Likewise, de Maricourt et al. found a decrease in benzodiazepine use in 75% of patients, with total withdrawal in 41% of them, 4 months after spa treatment accompanied by a psycho-educational programme (De Maricourt et al.2016). Spa therapy has also proved beneficial in burnout syndrome (Blasche et al 2010) and to treat pain in patients with fibromyalgia (Fraioli et al.2013).

Despite these encouraging effectiveness studies, there is a need to replicate these results and to better evaluate the curative factors involved during spa therapy that may be involved in its effectiveness. Recently, a preliminary study investigated the possibility of quantifying the relaxation obtained during spa therapy in 27 patients with GAD or MDD. A 13-item scale was created to measure their psychosomatic symptoms, and they were assessed by the Hamilton Anxiety and Depression (HAD) scale (Smarr and Keefer 2022) as well as a 4-item scale evaluating their state of relaxation every day. The patients exhibited an improvement in HAD scores at 4 months correlated with an increase in their state of relaxation and an improvement in their psychosomatic symptoms (Lo Ré et al 2018). One hypothesis that could explain these results is that what could be called a state of ‘letting go’ is induced by bubbling baths, thermal showers, swimming pools and massage during spa therapy, whatever the mental disorder targeted. This could correspond to the realization of a mental experience of relaxation with modification of the fluidity of consciousness. Nevertheless, a specific scale to test this psychosomatic state and the phenomenon of letting go during spa treatment is lacking. The aim of the current study, called LetGoTherm, was to investigate both the psychosomatic state and the letting go of patients with mental disorders after three weeks of spa therapy.

Few scales have been proposed to assess psychosomatic disorders in the general population (Shah et al. 2022; Li t al. 2020) or in a specific pathology (Erim et al 2009). Diagnostic criteria for research in the psychosomatic field have also been proposed in association with the evaluation of quality of life (Mangelli 2006). However, there is no scale that specifically evaluates patients with mental disorders treated by spa therapy. In the LetGoTherm study, therefore, we have developed a detailed questionnaire based on another questionnaire assessing psychosomatic symptoms that was developed in the study by Lo-Ré et al. (2018): the Saujon Psychosomatic Questionnaire (SPQ).

In addition, the assessment of letting go has received little attention to date. Letting go investigations need to call upon concepts from the phenomenological tradition. Indeed, the philosophical tradition is to focus on describing consciousness not as an object of study but rather as a conscious experience in all its dimensions. In this school of thought, i.e. that of Bergson (2004), James (2017), Husserl (2014) and more generally that of the phenomenological tradition, conscious experience is thought of as a continuous or discontinuous flow. Like the currents in a river, the flow varies in quality, form and quantity.

The more or less rapid transitions in the modalizations of consciousness (a term from Husserl) constitute the flow of consciousness. This flow (and therefore the transitions between the different modalizations) can be slowed down if the subject is preoccupied by a particular mental state, as in anxious or depressed states (Minkowski 2019; Fouks 1990). On the basis of this phenomenological conception of consciousness, a specific questionnaire was developed to quantify the fluidity of consciousness (Vion-Dury et al 2021). This questionnaire is called the Quantified Assessment of Fluidity of Consciousness Questionnaire (QACF) and was used in the LetGoTherm study.

The LetGoTherm study is thus the first to use both the SPQ and the QACF in patients undergoing spa therapy for mental disorders. The main hypothesis is that spa treatment generates a) an improvement in the psychosomatic state as evaluated with the SPQ, and b) an improvement in letting go, thanks to an increase in the fluidity of consciousness, as evaluated with the QACF. The second hypothesis is that the improvement in both the psychosomatic state and letting go is related to a decrease in anxiety, depressive symptoms and insomnia complaints.

Materials and methods

This study was validated by the CPP (Comité de Protection des Personnes), file n° 21.01. 13. 69040 by the CPP n° 21.02.08. The Thermes de Saujon spa resort was the promoter. According to the French classification, this is an RIPH3 type study.

A) Patients and study design

The study took place over 18 days and was offered to 65 patients from staying at Thermes de Saujon (Charente Maritime, France) from October 18, 2021. The clinical inclusion criteria were a) aged 18 years and over, b) presenting clinical symptoms indicating a state of anxiety or depression and with a Hospital Anxiety and Depression scale (HAD) score > 8, or insomnia with an Insomnia Severity Index (ISI) > 8. The clinical exclusion criteria were: a) having received a spa treatment in the previous 6 months, b) having begun a new anxiolytic or neuroleptic treatment within the previous 3 weeks, c) presence of a current severe mental disorder (mood disorder, anxiety disorder, psychosis, addiction interfering with night-time sleep, as judged by the investigators), d) presence of severe neurological disorders (epilepsy, neurodegenerative disease, stroke), e) presence of unstable cardiovascular and/or respiratory disease, f) pregnancy in the third trimester.

During their spa treatment, the subjects included in the study were asked to fill in four self-report questionnaires on the day their cure began (D1) and on the day it ended (D18). The questionnaires were the following: the Saujon Psychosomatic Questionnaire (SPQ), the Quantified Assessment of Fluidity of Consciousness Questionnaire (QACF), the Hospital Anxiety and Depression scale (HAD)(Smarr and Keefer 2022) and the Insomnia Severity Index (ISI)(Fabbri 2021).

B) The Saujon psychosomatic questionnaire (SPQ)

The 30-item self-report Saujon Psychosomatic Questionnaire (SPQ) was designed to assess psychosomatic symptoms in patients receiving spa therapy in the same resort as where the LetGoTherm study was conducted. The questions were designed by a group of physicians specialized in spa therapy. The SPQ is a detailed development of the short questionnaire assessing psychosomatic symptoms used in the study by Lo-Ré et al (2016). The SPQ uses some of the same criteria as in the PSSS (Li 2020), but emphasizes more specific problems encountered in patients receiving spa treatment. Each item is scored by the patient on a visual analogue scale from 1 to 10. The total score is obtained by adding up the items, except item 30 which is a quantitative item. The scale is presented in Table 1.

Table 1

Items of Saujon Psychosomatic Questionnaire (SPQ) The questionnaire is in French. The English translation is provided under each question. The instructions given to the participant are: “This scale allows you to evaluate different symptoms that you may have. It allows you to measure the discomfort you feel for each symptom. You are to rate each symptom on a scale from 0 to 10 based on how bad you feel now compared to the extremes of your sensations already experienced. If there is something else that we have not mentioned that bothers you, specify it in the "other symptoms" sections and indicate the corresponding intensity. Rate your feeling from 0 to 10.” The scoring of questions with an * must be reversed (If 10, noted 1, and vice versa).

N°	ITEM	Note (1–10)
1	Je me sens globalement bien. *I feel good overall.*	
2*	Je ressens de la fatigue. *I feel tired.*	
3*	Je ressens de la tension intérieure *I feel inner tension.*	
4*	Je suis mal à l’aise dans mon environnement professionnel ou social. *I am uncomfortable in my professional or social environment.*	
5	Je mémorise facilement. *I memorize things easily.*	
6*	J’ai de la difficulté à me concentrer *I have difficulty concentrating*	
7	Je suis libre de mes pensées *I am free of my thoughts*	
8	J’ai une activité physique et sportive normale (en tenant compte d’une éventuelle pathologie organique) *I have normal physical and sports activity (taking into account a possible organic pathology)*	
9*	Je me sens déprimé(e) *I feel depressed*	
10*	Les pensées viennent m’envahir *Thoughts overcome me*	
11	Je me sens bien accepté dans mon environnement amical *I feel well accepted among my friends*	

12*	Je suis mal à l'aise dans mon environnement familial *I am uncomfortable in my family environment*
13*	J'ai de la tachycardie et/ ou des palpitations *I have tachycardia and/or palpitations*
14*	Je respire mal, je me sens oppressé *I breathe badly, I feel oppressed*
15*	Je digère mal, j'ai souvent mal au ventre, ou j'ai souvent envie de vomir *I don't digest well, I often have* stomach*-ache, or I often feel like vomiting*
16*	J'ai des bouffées de chaleur *I have hot flushes*
17	L'organisation horaire de ma vie est bien équilibrée *My life schedule is well balanced*
18*	Je ressens une douleur ; son intensité est de: (valeur de 1à 10) *I feel pain; its intensity is: (value from 1 to 10)*
19	Je suis satisfait(e) de ma vie sexuelle *I am satisfied with my sex life*
20	J'ai l'impression d'avoir une vie harmonieuse. *I feel like I have a harmonious life*.
21	Je me sens capable d'aller vers les autres *I feel able to approach others*
22	J'ai l'impression d'avoir de l'élan, du dynamisme *I feel like I have momentum, dynamism*
23	J'ai un bon équilibre alimentaire *I have a well-balanced diet*
24	J'ai l'impression d'avoir ma vie bien en main *I feel like I have my life under control*
25	Êtes-vous satisfait(e) de l'évolution de votre consommation alimentaire ? Are you satisfied with how your food consumption is going?
26	Je prends des comprimés quotidiennement et cela me gêne *I take pills daily and it bothers me*

27*	Je me sens en cohérence avec moi-même *I feel consistent with myself*	
28	Je me sens prisonnier(ère) d'une addiction (tabac, alcool, objets connectés, pornographie, jeux …) *I feel trapped by an addiction (tobacco, alcohol, connected objects, pornography, games ...)*	
29*	J'apprécie ma vie actuelle *I enjoy my current life*	
30	Combien de comprimés par jour prenez-vous ? …….. *How many tablets a day do you take? .....*	///

C) The QAFC questionnaire

This scale was designed to assess the fluidity of consciousness related to what is called therapeutic letting go. It was initially constructed on the basis of a simple question: "what is your experience of letting go?". To construct the QAFC, this question was asked to a group of phenomenological experts. On the basis of the phenomenological elicitation of their experience (Petitmengin 2006; Vion-Dury and Mougin 2018), the questionnaire was developed in successive iterations.

The QAFC includes 17 items and can be found in (Vion-Dury et al. 2021). Validation analyses made it possible to calculate an overall Cronbach's coefficient of 0.78. Based on the correlations between items and total score, four dimensions (dim) were highlighted: a) Dim 1 = Availability to oneself and to the environment ($r > 0.6$), b) Dim 2 = Letting go ($0.60 > r > 0.50$), c) Dim 3 = Relative passivity towards the world ($0.50 > r > 0.40$) and d) Dim 4 = Acceptance of change ($r > 0.4$). The QAFC has been tested on different populations before and after hypnosis (Turcq 2018).

D) Statistical analyses

The data were anonymized by the Saujon spa team and were entered into Excel software. Statistical populations were described by means of Tukey's boxes showing medians, 25 and 75 percentiles. The means of the scores of each questionnaire were compared between D1 and D18 by paired two-tailed Student's t tests, with an alpha probability lower than 0.01. Similarly, correlation investigations with Pearson correlations were conducted between the scores of each questionnaire taken in pairs on D1 and D18.

Results

The average age of the study population was 56.9 (+/- 9.7) years. The median was 57.5 years, with a minimum of 31 years and a maximum of 76 years. The population included 8 men (12.31%) and 57

women (87.69%). The mental disorders presented were generalized anxiety disorder (n = 21, 32.31%), bipolar disorder (n = 5, 7.69%), major depressive disorder (n = 27, 41.54%), insomnia disorders (n = 3, 4.62%), burnout syndrome (n = 3, 4.62%), and fibromyalgia (n = 1, 1.54%).

Figure 1 shows the general structure of the statistical populations for the four scales at D1 and D18. Table 2details the values of the averages and the percentages of variation of the different scores. All variations were statistically significant.

Table 2.

Average scores on each scale at D1 and D18 with statistical significance and percentage change.

Date	**D1**	**D18**	**D1**	**D18**	**D1**	**D18**	**D1**	**D18**
Scale	**SPQ**		**QACF**		**HAD**		**ISI**	
Mean	150.46	179.51	50.08	60.66	20.89	14.8	16.19	13.65
Standard deviation	42.86	44.21	10.45	15.24	7.14	7.36	6.8	7.22
Student's t test	$p < 0.001$		$p < 0.001$		$p < 0.001$		$p < 0.001$	
% of variation	+ 19.3%		+ 23.03%		− 29.17%		− 15.68%	

Figure 2 shows the significant correlation between the SPQ and the QAFC, both at D1 and D18. Table 3 shows the different correlations between the scores on each scale. Significant correlations were observed at both D1 and D18 n a) between the SPQ and the HAD, b) between the SPQ and the ISI, c) between the QAFC and the HAD, d) between the QACF and the ISI, and e) between the ISI and the HAD. The correlation coefficient was higher at D18 than at D1 in all correlations. Table 4shows the correlation of the scores on each scale with each of the dimensions of the QAFC at D1 and D18. There was a significant correlation in all cases, except for Dim 1 and ISI at D1 and for Dim 3 and ISI at D18.

Table 3
Correlations between different scale values at D1 and D18

Correlations	D1	D18
SPQ vs QASF	y = 2,3699x + 31,785	y = 2,2172x + 43,4
	r = 0.57 (p < 0.01)	r = 0.66 (p < 0.01)
SPQ vs HAD	y = -4,9836x + 254,58	y = -5,0105x + 253,66
	r = -0.83 (p < 0.01)	r = -0.83 (p < 0.01)
SPQ vs ISI	y = -3,3575x + 204,83	y = -3,8606x + 232,22
	r = -0.53 (p < 0.01)	r = -0.60 (p < 0.01)
QASF vs HAD	y = -0,909x + 69,067	y = -1,2759x + 80,449
	r = – 0.62 (p < 0.01)	r = -0.71 (p < 0.01)
QASF vs ISI	y = -0,5754x + 59,393	y = -0,8771x + 73,567
	r = -0.37 (p < 0.01)	r = -0.47 (p < 0.01)
ISI vs HAD	y = 0,3456x + 9,6461	y = 0,5306x + 5,9581
	r = 0,41 (p < 0.01)	r = 0,53 (p < 0.01)

Table 4 Correlations between the four dimensions of the QACF and the scores on the other scales at D1 and D18.

Date	**Day 1**			**Day 18**		
Scale	**SPQ**	**HAD**	**ISI**	**SPQ**	**HAD**	**ISI**
Dim 1	0.52	0.52	0.33	0.62	0.65	0.48
Availability to self and to environment	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)
Dim 2	0.41	0.45	0.22	0.54	0.55	0.38
Letting go	(p < 0.01)	(p < 0.01)	(NS)	(p < 0.01)	(p < 0.01)	(p < 0.01)
Dim 3	0.56	0.54	0.36	0.39	0.49	0.29
Relative passivity to the world	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)	(NS)
Dim 4	0.39	0.49	0.29	0.56	0.66	0.42
Acceptance of change	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)	(p < 0.01)

Discussion

LetGoTherm is the first study to investigate the psychosomatic state and conscious experience related to ‘letting go’ in patients with mental disorders following an 18-day spa cure comprised of bubbling baths, jet showers, pool bathing and massage. To investigate psychosomatic state and letting go, which could be core factors helping to explain the therapeutic action of spa treatment, the authors administered two dedicated questionnaires at two time points. Moreover, they sought whether any improvement in psychosomatic state and letting go was related to a decrease in anxiety and depressive symptoms and insomnia complaints.

This preliminary work carried out on 65 patients demonstrated a significant effect of the spa treatment on psychosomatic state as well as a conscious experience related to ‘letting go’, as evaluated with the SPQ and the QACF. First, the spa treatment led to an improvement in depressive and anxiety symptoms, since there was a significant decrease (-29%) in the HAD score at the end of the intervention (Fig. 1C). This improvement was correlated with a significant decrease (-15.6%) in insomnia complaints, as observed on the ISI scale (Table 3). Results thus confirm those of the STOP-TAG study (5) and those of Lo Ré et al. (13). Under these conditions, a significant improvement (+ 19.3%) in the SPQ score (Fig. 1A) was observed at D18. This improvement was correlated with a reduction in depressive and anxiety symptoms as well as a reduction in insomnia complaints (Table 3). All these modifications at the end of the treatment were correlated with a 23% increase in fluidity of consciousness, as assessed by the QACF questionnaire (Fig. 1B). Among the dimensions of the QACF, dimensions 1 (availability to oneself and to the environment) and 4 (acceptance of change) were the best correlated with the decrease in the HAD score and with improvement on the SPQ at D18.

This study has some limitations. First, there was no control group. However, although better controlled studies are needed, the LetGoTherm study is the first to highlight the value of evaluating psychosomatic state and conscious experience related to ‘therapeutic letting go’ in the context of spa treatment. Therapeutic letting go and the reduction of psychosomatic symptomatology seem to be the core therapeutic factors in spa treatment. It would be interesting to study the impact of spa treatment on the dynamics of letting go, psychosomatic and clinical improvement in order to unravel the complex causal factors involved in the spa therapy effect. Second, given the predominantly female population studied, it was not possible to construct a gender match to assess whether there is a gender-related effect, even though spa treatment is known to be more attractive for women than for men. A gender difference could be a putative factor influencing the role of psychosomatic states and letting go, so this issue should be investigated in the future.

Despite these limitations, the study provides interesting data on an explanatory therapeutic factor involved in spa treatment. Various studies have attempted to explain the pathophysiological mechanisms underlying the effectiveness of spa therapy. A decrease in salivary cortisol levels, a stress marker that is modified by psychotropic drugs, was reported after spa bathing (Toda 2006) and the affinity of the serotonin transporter, which is altered in MDD, was increased between 30 minutes and 1 week after spa

treatment in ozonized water (Marazziti et al 2007). Similarly, warm footbaths (via hyperthermia) have been shown to induce relaxation, with a concomitant decrease in sympathetic tone and serum cortisol levels as well as an elevation in salivary secretory IgA. In addition, spa therapy modifies the cytokine environment, especially with an increase in interleukin 1 (Lange et al 2006), and it stimulates several functions of mononuclear cells. Furthermore, a local effect through nociceptive skin receptors and central effects on endorphins and immune factors were posited by Lange et al. (2006). In patients with fibromyalgia, spa treatment has been shown to stimulate the hypothalamic axis, corticotropic releasing factor, and adrenocorticotropic hormone in correlation with a decrease in pain. The discharge of corticoids in the blood and the increase in beta-endorphin serum levels are followed by a reduction in pain symptoms, which is closely related to an improvement in disability, anxiety-depressive state, and quality of life. In other types of spa treatments, mud packs act by helping the physiological responses to achieve homeostasis and to rebalance the stress response system (Bellometti and Galzigna 1999). Another hypothesis is that spa treatment could stimulate αMSH cutaneous cells, which could in turn activate the corticotropic system (Schauer et al. 1994). Lastly, gate control theory might explain why heat and the hydrostatic pressure of water on the body surface can decrease the sensation of mental and physical pain (Dönmez et al 2005).

The multiple correlations between the different factors quantified in the present study do not allow us to ascertain exactly how spa therapy triggers psychosomatic states and induces therapeutic letting go. This testifies to the complexity of the therapeutic action of spa therapy. While we cannot formally determine the explanatory variable, we hypothesize that all these actions covary to generate a new psychosomatic state and a conscious experience. Such an assumption requires the design of investigations related to the physiological mechanisms suggested in previous studies (Toda et al 2006; Marazziti et al.2007; Lange et al 2006). What the analyses of psycho-somatic states and the different dimensions of fluidity of consciousness do suggest is that the patients may become more available and more able to change their psycho-physiological state thanks to spa treatment with bubbling baths, jet showers, pool bathing and massage.

Declarations

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Figures

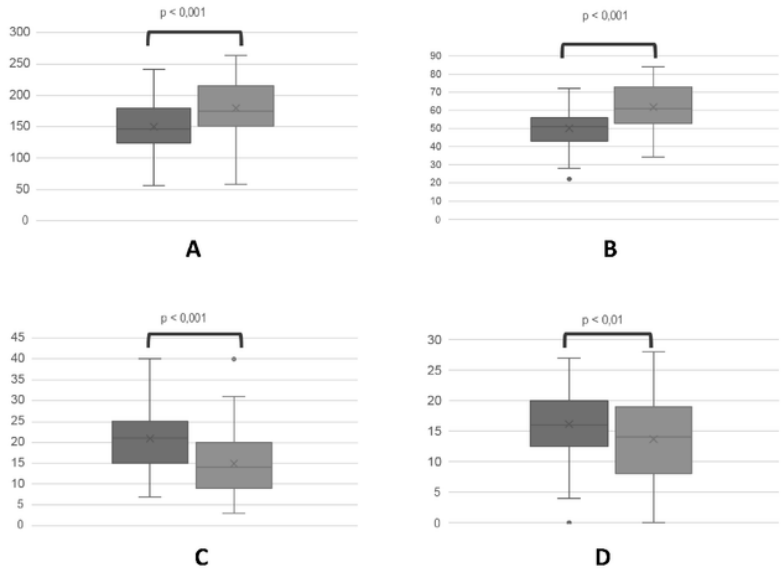

Figure 1

Structure of statistical populations for each scale using Tukey's boxes, at D1 (in dark grey) and D18 (in light grey), for: A) Saujon Psychosomatic Questionnaire (SPQ); B) Quantified Assessment of Consciousness Fluency questionnaire (QACF), C) HAD scale, and D) ISI scale.

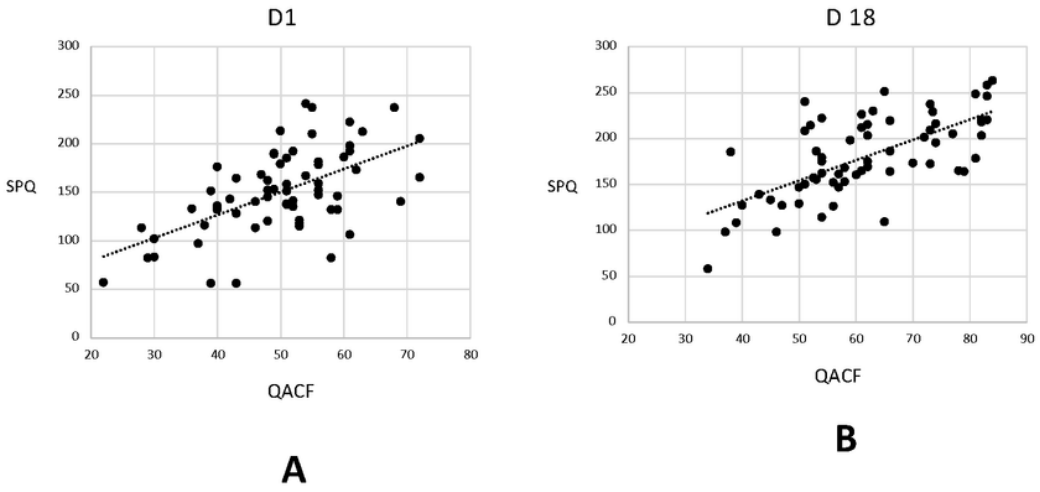

Figure 2

Correlations at D1 and D18 between Saujon Psychosomatic Questionnaire (SPQ) and Quantified Assessment of Consciousness Fluency questionnaire (QACF). Equations and values of correlation coefficients are given in Table 3.