



ELSEVIER

Contents lists available at ScienceDirect

# Consciousness and Cognition

journal homepage: [www.elsevier.com/locate/concog](http://www.elsevier.com/locate/concog)

## Changes in the sense of agency during hypnosis: The Hungarian version of the Sense of Agency Rating Scale (SOARS-HU) and its relationship with phenomenological aspects of consciousness

András Költő<sup>a,\*</sup>, Vince Polito<sup>b</sup><sup>a</sup> Institute of Psychology, Faculty of Education and Psychology, Eötvös Loránd University, Budapest, Hungary<sup>b</sup> ARC Centre of Excellence in Cognition and its Disorders and Department of Cognitive Science, Macquarie University, Sydney, Australia

### ARTICLE INFO

#### Article history:

Received 26 September 2016

Revised 26 January 2017

Accepted 8 February 2017

#### Keywords:

Sense of agency

Hypnosis

Altered state of consciousness

Involuntariness

Effortlessness

### ABSTRACT

Changes in the sense of agency are defining feature of hypnosis. The Sense of Agency Rating Scale (SOARS) is a 10-item questionnaire, administered after a hypnosis session to assess alteration in the sense of agency. In the present study, a Hungarian version of the measure (SOARS-HU) is presented. The SOARS-HU and the Phenomenology of Consciousness Inventory (PCI) were administered to 197 subjects following hypnotizability screening with the Harvard Group Scale of Hypnotic Susceptibility Scale, Form A (HGSHS:A). Confirmatory factor analysis and correlations with hypnotizability demonstrate the reliability and validity of the SOARS-HU. Changes in the *Involuntariness* and *Effortlessness* sub-scales of the SOARS-HU were associated with alterations in subjective conscious experience, as measured by the PCI. These changes in subjective experience remained significant after controlling for HGSHS:A scores. These results indicate that changes in the sense of agency during hypnosis are associated with alterations of consciousness that are independent of hypnotizability.

© 2017 Elsevier Inc. All rights reserved.

### 1. Introduction

Sense of agency refers to an individual's subjective feeling or judgment that she or he has caused some event in the world to occur (Gallagher, 2000). It is a phenomenal quality associated with action or thought that allows us to distinguish sensory consequences that we have caused from those that are externally-generated. In this way, sense of agency is a fundamental aspect of conscious experience. Most of the time, sense of agency operates quite unremarkably: an individual will have an intention to carry out some action (e.g., to switch on a light), will make the relevant movement (e.g., flicking the light switch) and will have a sense of agency for the sequence of events (i.e., will feel as if they have caused the light to come on). There are situations, however, where the normal functioning of sense of agency can be disrupted or altered. One striking example is the experience of susceptible participants in hypnosis.

For high hypnotizable individuals, simple verbal instructions from a hypnotist can lead to remarkable changes in conscious experience, and in particular, to marked alterations to sense of agency. This change in subjective feelings of control has been consistently reported in the hypnosis literature (Bowers, 1982; Bowers, Laurence, & Hart, 1988; Weitzenhoffer,

\* Corresponding author at: Department of Affective Psychology, Institute of Psychology, Eötvös Loránd University, Budapest, Izabella utca 46, Pf. 755, H-1384, Hungary.

E-mail address: [kolto.andras@ppk.elte.hu](mailto:kolto.andras@ppk.elte.hu) (A. Költő).

1974; Woody & McConkey, 2003). Although hypnosis is typically associated with non-voluntary responding (Bowers, 1981), there are also a number of findings that show hypnosis can, in fact, *increase* voluntariness. For instance, in active-alert hypnosis, the subject rides a stationary bicycle, and the hypnotist gives suggestions for alertness, freshness and power (Banyai & Hilgard, 1976). In the treatment of trichotillomania, suggestions for “self-agency” and free choice over one’s actions can reduce obsessive hair pulling through enhancing sense of agency (Iglesias, 2003). For these reasons, we use the terms “alteration” or “change” rather than “reduction” of sense of agency throughout the current article.

Despite the universal recognition of agency alteration as a key feature of hypnosis, this construct has been inconsistently operationalized. Polito, Barnier, and Woody (2013) sought to clarify the conceptual confusion around subjective control in hypnosis by developing a psychometric measure the Sense of Agency Rating Scale (SOARS) to quantify alterations to participants’ sense of agency. This measure was derived from factor analysis of a large number of scale items based on a broad review of the various ways agency has been described in the psychological, philosophical and neuroscientific literatures.

The SOARS comprises two factors, representing distinct aspects of the phenomenology of action: *Involuntariness* and *Effortlessness*. *Involuntariness* represents changes in attributions of personal influence over self-produced actions. *Effortlessness* represents changes in the ease with which self-produced actions are performed and the passive experience of events as they unfold. This two-factor model is compatible with recent theoretical accounts of agency such as those proposed by Gallagher (2012) and Synofzik, Vosgerau, and Neven (2008). The SOARS has been shown to be a valid and reliable tool for quantifying agency alterations associated with specific elements of the hypnotic context (Polito, Barnier, Woody, & Connors, 2014) and for comparing the experiences of participants in hypnosis with clinical alterations of agency (Polito, Langdon, & Barnier, 2015).

Another measure that has been used to quantify subjective experiences is the Phenomenology of Consciousness Inventory (PCI; Pekala, 1991). The PCI questionnaire measure consists of 53 items and taps into various phenomenological changes that may occur in any situation that might be associated with an altered state of consciousness (e.g., hypnosis, meditation, day-dreaming, drug consumption etc.). The PCI has been used to assess subjective experiences in a range of contexts, for instance out-of-body experiences (Maitz & Pekala, 1991), meditation (Venkatesh, Raju, Shivani, Tompkins, & Meti, 1997), firewalking (Pekala & Ersek, 1993), and drumming (Maurer, Kumar, Woodside, & Pekala, 1997; Szabó, 2003). In our Hypnosis Laboratory at Department of Affective Psychology, Eötvös Loránd University, the PCI is routinely used to assess phenomenological changes co-occurring with experimentally induced ASCs, especially with hypnosis (Józsa, 2012; Költő, 2015; Varga, 2013; Varga, Banyai, Gósi-Greguss, & Tauszik, 2013; Varga, Jozsa, Banyai, Gosi-Greguss, & Kumar, 2001). Of particular relevance to this research, one of the PCI dimensions – *Volitional Control* – directly assesses alterations in the sense of agency occurring in altered states of consciousness (see Section 2 for description of all PCI dimensions).

Many mental illnesses are also associated with altered feelings of control over behavior (e.g. obsessive-compulsive disorders, eating disorders or addictions) or with lack of initiative (e.g. depression). Modification to sense of agency via hypnotic suggestions may be an important component of clinical hypnosis to treat these conditions. A better understanding of how hypnosis modulates sense of agency may help us to design better hypnotherapeutic interventions, addressing problems associated with intentions, initiative and will. The SOARS has been used in clinical contexts (Polito et al., 2015) as well as in hypnosis research, and it may also serve as a tool to investigate agency-modulating effects of specific hypnotic interventions. In particular, the effectiveness of any given clinical hypnosis intervention seems to be partially independent of the patient’s hypnotic susceptibility (Williamson, 2012). The SOARS may be a helpful tool for understanding and separating the roles of volition and hypnotizability in the therapeutic context.

### 1.1. Research aims and hypotheses

The current study had three aims. Our first aim was to translate the Sense of Agency Rating Scale to Hungarian (SOARS-HU), and to test the validity and reliability of this measure. We hypothesized that the Hungarian version of the measure would have a factor structure similar to the original version, and yield similar scores as the original SOARS. Additionally, we expected that the SOARS-HU would correlate with HGSHS:A total and factor scores.

Our second aim was to explore convergent validity between our specific measure of sense of agency (the SOARS-HU) and a measure of the phenomenological qualities of an altered state of consciousness (the PCI). We hypothesized that both SOARS factors (*Involuntariness* and *Effortlessness*) would be associated with the PCI dimensions of *Volitional Control*, *Altered Experience*, *Altered State of Awareness*, and *Self Awareness*. This study is the first to investigate the specific relationship between sense of agency alteration (as measured by the SOARS) and the phenomenological aspects of altered consciousness (as measured by the PCI) in hypnosis.

Our third aim was to investigate whether the association between altered agency and the phenomenological qualities of an altered state of consciousness varied according to participants’ level of hypnotizability. Although individuals are typically broadly classified as either low, medium or high hypnotizable, it is well accepted that there is considerable variation in individuals’ experiences during hypnosis (McConkey & Barnier, 2004; Sheehan & McConkey, 1982). In particular, recent findings have shown that individuals may experience reduced agency at different levels of hypnotic susceptibility (Terhune, Polito, Barnier, & Woody, 2016) or in response to factors unrelated to hypnotizability (Polito et al., 2014). In light of these findings, we hypothesized that associations between the SOARS factors and PCI dimensions would remain consistent when controlling for hypnotizability.

## 2. Method

### 2.1. Participants

One hundred and ninety-seven healthy adults took part in the investigation (67 males and 130 females), of whom 165 gave information on age. Their age ranged from 18 to 70 years, with a mean of 26.78 ( $SD = 10.51$ ). The sample consisted of: (1) undergraduate psychology students taking part in introductory or methodological courses on hypnosis ( $n = 91$ ); (2) undergraduate students or graduated professionals from many areas, e.g. information technologies, engineering, law, economy, or arts ( $n = 102$ ). Four participants did not provide information on their profession.

### 2.2. Materials

#### 2.2.1. Hungarian version of Harvard Group Scale of Hypnotic Susceptibility (Költő, Gósi-Greguss, Varga, & Bányai, 2015)

Hypnotic responsiveness of the participants was tested using the Hungarian version of the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) (Költő et al., 2015), complying with the standard instructions. The HGSHS:A was originally developed by Shor and Orne (1962), to assess the hypnotic response of larger groups, thus replacing the individually administered Stanford Hypnotic Susceptibility Scale, Form A (SHSS:A) (Weitzenhoffer & Hilgard, 1959). The HGSHS:A consists of a hypnotic induction, followed by a series of twelve suggestions and then finally a hypnotic deinduction. Based on the first experiences with the SHSS:A, Hilgard (1965) differentiated three underlying factors: *direct motor* suggestions, whereby participants are instructed to perform a specific motor action (e.g. the subject feels that her left hand is heavy and it will lower it); *motor challenge* suggestions, whereby a specific type of movement is inhibited and then the participant is “challenged” to carry out a given action (e.g., in spite of having been told that her two hands are tightly interlocked, the participant is asked to try and separate them); and *cognitive-perceptual* suggestions, whereby participants experience changes in their sensory experience or beliefs (e.g., hallucinating a fly buzzing around the room). Scores for each of these categories are calculated by summing the number of items of each type that a participant passed. Subsequent factor analytic examinations of HGSHS:A, conducted in different countries and with various sample sizes (e.g., Költő, Gósi-Greguss, Varga, & Bányai, 2013; McConkey, Barnier, Maccallum, & Bishop, 1996; Peters, Dhanens, Lundy, & Landy, 1974; Rudski, Marra, & Graham, 2004), supported this three-factor structure.

There were two differences in our administration of the HGSHS:A compared to the original SOARS study. First, whereas Polito et al. (2013) used a slightly modified version of the HGSHS:A (suggestions for arm immobilization and arm rigidity were skipped), we administered the full scale consisting of 12 suggestions. Second, in the original study a tape-recorded version of the HGSHS:A was used, whereas in the present study the screening was administered live.

#### 2.2.2. Sense of Agency Rating Scale – Hungarian (SOARS-HU)

The SOARS (Polito et al., 2013) is a 10-item scale that measures subjective alterations to the sense of agency. Participants rate their level of agreement with a series of statements on a 7-point Likert scale from “strongly disagree” to “strongly agree”. The scale has two factors: (1) Involuntariness, with items such as “I felt that my experiences and actions were not caused by me” that represent a subjectively experienced reduction in control over one’s own actions; and (2) Effortlessness, with items such as “My experiences and actions occurred effortlessly” that represent a subjectively experienced increase in the ease and automaticity with which actions occur. The original English version of the scale was translated to Hungarian by the first author and then back-translated by a colleague with four decades of expertise in hypnosis research and excellent English language skills. The back-translation was thoroughly analyzed by the second and the first author and, where needed, linguistic corrections were made in the text of the SOARS-HU items. Our aim was to reach the best possible match between the meaning of the English and the Hungarian items. Just as in the study of the original questionnaire, the SOARS-HU was completed by participants following administration of the HGSHS:A, as detailed in the procedure below.

#### 2.2.3. Phenomenology of Consciousness Inventory (Pekala, 1982, 1991)

The PCI (Pekala, 1982, 1991) is a 53 item scale with 12 main dimensions (and 14 sub-dimensions). Each item consists of two statements as descriptors for a 7-point Likert scale. The statements represent “dipoles”, namely, one statement describes experiences associated with everyday waking consciousness, while the other describes the same experience within the context of an altered state of consciousness (ASC). The main dimensions are: (1) *Altered Experience*, representing changes in body image, time sense, perception and meaning; (2) *Positive Affect*, representing feelings of ecstasy, extreme happiness, sexual feelings, love, and loving-kindness; (3) *Negative Affect*, representing feelings of anger, sadness and fear; (4) *Attention*, representing inner focus and absorption; (5) *Imagery*, representing amount and vividness of imaginative activity; (6) *Self-awareness*, representing the extent to which the person is aware of their identity; (7) *Altered State of Awareness*, representing experience of extraordinarily unusual states of awareness; (8) *Arousal*, representing muscular tension; (9) *Rationality*, representing the degree to which thinking is clear and distinct; (10) *Volitional Control*, representing the feeling of being able to intentionally generate actions; (11) *Memory*, representing confidence in recall ability; and (12) *Internal Dialogue*, representing the experience of a stream of self-conversation like thoughts.

### 2.3. Procedure

In the present study, hypnotizability screenings were conducted live, by one of two hypnotists. Twelve HGSHS:A sessions were held in total, with an average of 16 subjects participating in each session. Before the hypnosis session, all participants were informed about the general purpose of the investigation (“a detailed analysis of hypnotic susceptibility and related psychological factors”), and provided written consent. Participants then underwent the standard HGSHS:A procedure. Following the hypnotic deinduction, participants were asked to fill in the 10-item SOARS-HU and the 53-item PCI. The two measures were administered in a randomized counterbalanced order (SOARS-PCI for 107 subjects and PCI-SOARS for 90 subjects). Lay-out and wording of the questionnaires followed the original versions.

The examinations were carried out with adherence to the Professional Ethical Code of the Hungarian Psychological Association. The study was approved by the Research Ethics Committee at Eötvös Loránd University, Faculty of Education and Psychology, under Decision No. 2015/271.

#### 2.3.1. Statistical analysis

Confirmatory analysis was performed by *Mplus* version 6.0 (Muthén & Muthén, 2007). Comparative and discriminant analyses were carried out by SPSS 19.0 for Windows. All significances were set at 0.05, two-tailed. When calculating large numbers of comparisons significance levels were adjusted by the Holm-Bonferroni method (Holm, 1979) to prevent accumulation of Type I error.

## 3. Results

### 3.1. Confirmatory factor analysis (CFA)

To test whether the factor structure of SOARS-HU was psychometrically consistent with the original SOARS, a CFA was conducted using structural equation modeling. Since the items did not follow a normal distribution, a robust estimation method (MLM) was used (Brown, 2015). We tested if the hypothetical model of the original SOARS factor structure fits the Hungarian data (i.e., assuming that SOARS-HU items will load on the same factor as in SOARS). The model fit indices found in Polito et al.'s original study and in the current investigation are presented in Table 1.

Although goodness-of-fit indices – including CFI, TLI, and RMSEA – showed favorable values for SOARS-HU, the badness-of-fit indicator, chi-squared, was significant. We note, however, that Chi-squared is regarded as an “idealistic” indicator, because in larger samples, it is very likely to be significant (Byrne, 2010). To make sure that SOARS-HU factors show sufficient internal consistency, we conducted an exploratory factor analysis as well. The factor loadings were, in general, comparable to those observed in the original, with the exception of Item 8 (in English: 8. “I was mostly absorbed in what was going on”, in Hungarian: “Nagymértékben bevonódtam abba, ami éppen történt”), which shows a high cross-factorial loading (Table 2). The reason for this may be that while Involuntariness shows excellent internal consistency ( $\alpha = 0.901$ , in the original SOARS  $\alpha = 0.907$ ), reliability of Effortlessness is lower than in the original (in SOARS-HU,  $\alpha = 0.662$ , while in SOARS  $\alpha = 0.734$ ).

Although the reliability of the SOARS-HU Effortlessness subscale is lower than the original, in sum these indices suggest that the 2-factor model of the SOARS adequately fits the current SOARS-HU data.

### 3.2. Comparing mean scores of SOARS and SOARS-HU

Table 3 shows group means for the SOARS-HU and for the original SOARS from a comparable sample of Australian student participants. *Involuntariness* scores were not significantly different; *Effortlessness* scores were slightly (and significantly) higher in the Hungarian sample than among the Australian subjects. However, the magnitude of the effect was low. In the original study, the two scales correlated at a level of  $r = 0.373$ ,  $p < 0.001$ ; in the present sample, their association was  $r = 0.497$ ,  $p < 0.001$ .

### 3.3. Relationship between hypnotizability and sense of agency

To test if SOARS-HU scores were associated with HGSHS:A total scores and factors, correlations were calculated. The results are presented in Table 4.

**Table 1**  
Model fit indices of SOARS and SOARS-HU.

Model fit index	SOARS	SOARS-HU
Chi-squared (df = 34)	48.35, $p = 0.053$	57.78, $p = 0.007$
Comparative fit index (CFI)	0.958	0.966
Tucker-Lewis index (TLI)		0.954
Root-mean square error of approximation (RMSEA)	0.061	0.060 [0.031–0.085]
PCLOSE		0.257

**Table 2**  
Factor loadings in SOARS and SOARS-HU.

	SOARS factors (N = 370)		SOARS – HU factors (N = 197)	
	1	2	1	2
<i>Involuntariness</i>				
2. I chose how to respond*	<b>–0.868</b>	0.05	<b>–0.901</b>	0.044
5. My experiences and actions were under my control*	<b>–0.851</b>	0.001	<b>–0.935</b>	–0.109
6. I felt that my experiences and actions were not caused by me	<b>0.821</b>	0.046	<b>0.886</b>	–0.08
3. My experiences and actions felt self generated*	<b>–0.81</b>	0.068	<b>–0.856</b>	0.037
9. My responses were involuntary	<b>0.749</b>	0.06	<b>0.628</b>	0.234
<i>Effortlessness</i>				
4. I embraced the suggestions freely	0.163	<b>0.736</b>	0.219	<b>0.551</b>
7 My experiences and actions occurred effortlessly	–0.002	<b>0.637</b>	–0.17	<b>0.774</b>
1. Following suggestions was hard	–0.098	<b>–0.628</b>	0.194	<b>–0.711</b>
8. I was mostly absorbed in what was going on	–0.049	<b>0.594</b>	0.349	<b>0.494</b>
10. I was reluctant to follow suggestions*	0.002	<b>–0.452</b>	0.195	<b>–0.504</b>

Note. The order of the items corresponds the factor loadings in the SOARS; asterisk signs that the given item is reverse scored.

**Table 3**  
Factor scores in SOARS and SOARS-HU.

Factor	SOARS (N = 370)		SOARS-HU (N = 197)		Difference			
	M	SD	M	SD	t	df	sig.	d
Involuntariness	17.59	7.16	18.43	7.50	–1.31	565	0.191 ns	0.11
Effortlessness	22.77	5.51	24.77	5.34	–4.16	565	<0.001	0.35

The pattern of associations between HGSHS:A total scores and factors, and SOARS-HU scores was consistent with the associations reported in Polito et al. (2013). Just as in the original sample, SOARS-HU shows a somewhat smaller association with perceptual-cognitive HGSHS:A items than with the direct motor and motor challenge items.

### 3.4. Relationship between hypnotizability and phenomenological changes in consciousness

To see whether hypnotizability – as measured by HGSHS:A – was associated with the phenomenological alterations that subjects experienced during hypnosis, we calculated the correlations between HGSHS:A self-scores and PCI scores. These are presented in Table 5.

These values are comparable to those obtained in earlier studies (e.g., Kumar & Pekala, 1988). There are, however a number of important methodological differences. While Kumar and Pekala enrolled a 4-min silent phase in the administration of HGSHS:A, and their subjects filled in PCI regarding this phase, our subjects responded to PCI reporting on the whole hypnosis session.

### 3.5. Relationship between the phenomenological changes in consciousness and sense of agency

The Phenomenology of Consciousness Inventory (Pekala, 1982, 1991) is an extensive measure of a wide range of experiences associated with altered states of consciousness. Here we present relationships found in our sample between each of the major PCI dimensions and SOARS-HU Involuntariness and Effortlessness scores. We were interested first, in the direct

**Table 4**  
Correlations between Australian and Hungarian SOARS scores and HGSHS:A scores.

	SOARS (N = 370)		SOARS-HU (N = 197)	
	r	sig. <sup>a</sup>	r	sig. <sup>a</sup>
HGSHS:A total – SOARS involuntariness	0.56	<0.001	0.54	<0.001
HGSHS:A total – SOARS effortlessness	0.39	<0.001	0.44	<0.001
HGSHS:A direct motor – SOARS involuntariness	0.46	<0.001	0.39	<0.001
HGSHS:A direct motor – SOARS effortlessness	0.39	<0.001	0.27	<0.001
HGSHS:A challenge – SOARS involuntariness	0.40	<0.001	0.47	<0.001
HGSHS:A challenge – SOARS effortlessness	0.27	<0.001	0.38	<0.001
HGSHS:A cognitive – SOARS involuntariness	0.28	<0.001	0.24	=0.001
HGSHS:A cognitive – SOARS effortlessness	0.17	=0.001	0.27	<0.001

<sup>a</sup> Adjusted for Holm-Bonferroni criteria.



**Table 5**  
Correlations between Hungarian HGSHS:A and PCI scores.

	<i>r</i>	sig. <sup>a</sup>
HGSHS:A total – PCI altered experience	0.43	<0.001
HGSHS:A total – PCI positive affect	0.27	<0.001
HGSHS:A total – PCI negative affect	–0.02	0.810 ns
HGSHS:A total – PCI attention	0.28	<0.001
HGSHS:A total – PCI imagery	0.05	0.451 ns
HGSHS:A total – PCI self-awareness	–0.44	<0.001
HGSHS:A total – PCI altered state of awareness	0.45	<0.001
HGSHS:A total – PCI arousal	–0.18	0.013 ns
HGSHS:A total – PCI rationality	–0.28	<0.001
HGSHS:A total – PCI volitional Control	–0.36	<0.001
HGSHS:A total – PCI memory	–0.41	<0.001
HGSHS:A total – PCI internal Dialogue	–0.003	0.957 ns

<sup>a</sup> Adjusted for Holm-Bonferroni criteria.

relationships between SOARS-HU and PCI scores, and, second, in testing whether these relationships were influenced by the behavioral aspect of hypnotizability (measured by HGSHS:A scores). Therefore first Pearson's *r* correlation coefficients were calculated, and then partial correlations were computed, controlling for HGSHS:A scores. Table 6 shows the associations between SOARS-HU factors and the major PCI dimensions.

As shown in Table 6, there are small to high associations between SOARS-HU scores and many PCI dimensions. Involuntariness, in general, showed somewhat higher associations with PCI dimensions than Effortlessness. Controlling the relationships for HGSHS:A reduces the magnitude of correlation coefficients to a slight extent, but with the exceptions *Involuntariness–Positive Affect*, *Involuntariness–Arousal*, *Effortlessness–Imagery* and *Effortlessness–Memory*, controlling for the effect of hypnotizability did not make the associations insignificant.

We found strong associations between each of the key hypothesized PCI dimensions and SOARS subscales. In particular, *Volitional control* was strongly negatively associated with *Involuntariness* ( $r = -0.62, p < 0.001$ ), and more modestly with *Effortlessness* ( $r = -0.38, p < 0.001$ ). *Altered Experience* was associated with both *Involuntariness* ( $r = 0.59, p < 0.001$ ) and *Effortlessness* ( $r = 0.46, p < 0.001$ ); *Altered State of Awareness* was associated with both *Involuntariness* ( $r = 0.64, p < 0.001$ ) and *Effortlessness* ( $r = 0.35, p < 0.001$ ); and *Self Awareness* was negatively associated with both *Involuntariness* ( $r = -0.64, p < 0.001$ ) and *Effortlessness* ( $r = -0.38, p < 0.001$ ).

There were also a number of unexpected associations. *Positive Affect* was associated with both *Involuntariness* ( $r = 0.20, p = 0.005$ ) and *Effortlessness* ( $r = 0.25, p < 0.001$ ), but these associations disappeared when controlling for hypnotizability. *Attention* was associated with both *Involuntariness* ( $r = 0.32, p < 0.001$ ) and *Effortlessness* ( $r = 0.46, p < 0.001$ ). *Arousal* was negatively associated with *Effortlessness* ( $r = -0.22, p < 0.001$ ). *Rationality* was negatively associated with *Involuntariness* ( $r = -0.22, p < 0.001$ ). Finally, *Memory* was negatively associated with *Involuntariness* ( $r = -0.45, p < 0.001$ ), and also *Effortlessness* ( $r = -0.22, p = 0.002$ ), but this later association disappeared when controlling for hypnotizability.

These results indicate that (1) changes in the subjective sense of agency are associated with other phenomenological aspects of hypnotic alterations in consciousness, and (2) relationships between alterations in perceived agency and phenomenological dimensions of consciousness are mostly independent from the behavioral aspect of hypnotic susceptibility.

**Table 6**  
Associations between Hungarian SOARS-HU involuntariness and PCI subscales.

PCI Scales	Associations with SOARS-HU involuntariness				Associations with SOARS-HU effortlessness			
	Bivariate correlations		Partial correlations, controlling for HGSHS:A scores		Bivariate correlations		Partial correlations, controlling for HGSHS:A scores	
	<i>r</i>	sig. <sup>a</sup>	<i>r</i>	sig. <sup>a</sup>	<i>r</i>	sig. <sup>a</sup>	<i>r</i>	sig. <sup>a</sup>
Altered experience	<b>0.59</b>	0.006	<b>0.47</b>	0.007	<b>0.46</b>	0.004	<b>0.34</b>	0.004
Positive affect	<b>0.20</b>	0.010	<b>0.07</b>	0.357 ns	<b>0.25</b>	0.007	<b>0.15</b>	0.036
Negative affect	<b>0.03</b>	0.715 ns	<b>0.04</b>	0.559 ns	<b>–0.14</b>	0.050	<b>–0.15</b>	0.034
Attention	<b>0.32</b>	0.008	<b>0.21</b>	0.008	<b>0.46</b>	0.005	<b>0.39</b>	0.004
Imagery	<b>0.07</b>	0.300 ns	<b>0.05</b>	0.454 ns	<b>0.15</b>	0.037	<b>0.14</b>	0.051 ns
Self-awareness	<b>–0.64</b>	0.005	<b>–0.53</b>	0.006	<b>–0.38</b>	0.006	<b>–0.23</b>	0.006
Altered state of awareness	<b>0.64</b>	0.004	<b>0.52</b>	0.006	<b>0.35</b>	0.006	<b>0.19</b>	0.009
Arousal	<b>–0.16</b>	0.012	–0.08	0.257 ns	<b>–0.22</b>	0.010	<b>–0.16</b>	0.026
Rationality	<b>–0.45</b>	0.007	<b>–0.37</b>	0.004	–0.13	0.068 ns	–0.01	0.868 ns
Volitional control	<b>–0.62</b>	0.005	<b>–0.55</b>	0.004	<b>–0.38</b>	0.005	<b>–0.27</b>	0.005
Memory	<b>–0.45</b>	0.006	<b>–0.30</b>	0.004	<b>–0.22</b>	0.008	–0.05	0.511 ns
Internal dialogue	–0.03	0.665 ns	–0.03	0.633 ns	<0.01	0.099 ns	–0.03	0.633 ns

Note: Significant correlation coefficients are marked with bold letters.

<sup>a</sup> Adjusted for Holm-Bonferroni criteria.

## 4. Discussion

The SOARS has been shown to be a psychometrically sound, reliable and valid test for measuring hypnotic modulation of the sense of agency (Polito et al., 2013, 2014). The current study sought to extend research with this measure to answer three questions. First, could the SOARS be applied to another language and culture? Second, would this translated measure show convergent validity with another measure of altered experiences. Third, would the behavioral aspect of hypnotizability influence the SOARS–PCI links?

### 4.1. Summary of the findings

In answer to the first question, we found that the factorial structure of SOARS–HU fit the original model. In addition, the mean scores of Hungarian participants were comparable to those of the Australian subjects (*Effortlessness* had a somewhat higher mean in the present sample than in the original, but the effect size of the difference was rather low). SOARS–HU *Involuntariness* and *Effortlessness* scores showed a pattern of associations with HGSHS:A total scores and subscale scores that was consistent with the original SOARS results. These findings support the notion that changes in the perceived agency under hypnosis are universal, and that subjective changes in agency emerge as participants respond to hypnotic suggestions (Polito et al., 2014).

Second, we expected that *Involuntariness* and *Effortlessness* would be associated with those PCI dimensions implicated in hypnotic behavior, namely *Volitional Control*, *Altered Experience*, *Altered State of Awareness* and *Self-Awareness*. Each of these PCI dimensions showed medium-large associations with *Involuntariness* and small-medium associations with *Effortlessness*. This pattern of results indicated that alterations in the sense of agency do not occur in isolation during hypnosis, but rather are associated with generalized changes in multiple aspects of consciousness experience.

Third, we wanted to test if the associations between sense of agency (as measured by the SOARS) and general alterations of consciousness (as measured by the PCI) were influenced by the behavioral aspect of hypnotic susceptibility. The associations between PCI and SOARS–HU factors were only slightly smaller when controlling for HGSHS:A scores. This indicates that level of hypnotizability (as assessed by a behavioral scale) does not influence the relationship between sense of agency and the subjective experience of altered states of consciousness.

### 4.2. Changes in the sense of agency and altered experiences under hypnosis

In line with our hypotheses, both SOARS subscales showed a negative association with the PCI's *Volitional Control* subscale. *Involuntariness* however showed a stronger negative association with *Volitional Control* ( $-0.62$ ) than did *Effortlessness* ( $-0.38$ ). This difference confirms the discriminant validity of the two SOARS–HU subscales. Consistent with previous interpretations (Polito et al., 2013, 2014), this suggests that *Involuntariness* taps more directly into changes in feelings of control and volition, whereas *Effortlessness* may tap more subtle experiences of passive automaticity.

Given that subjective involuntariness has historically been associated with scoring higher on hypnotizability scales (Bowers, 1981), we wanted to test whether the associations between PCI *Volitional Control* and the SOARS–HU subscales were affected by the subjects' hypnotic susceptibility. We found, however, that the link between changes in agency and volitional control was not changed when controlling for hypnotizability.

Hypnotic suggestions may be the main trigger for changes in agency and the other alterations of consciousness reported by participants in this study. This notion is in line with the conclusion of Bernheim (1891), who, based on his clinical observations, stated that all phenomena of hypnosis can be attributed to suggestions. He differentiated the hypnotic depth of his subjects based on the types of suggestions they could perform. The notion that the *content* of a suggestion may serve as the main source for perceived involuntariness and effortlessness (or voluntariness and effort) is strongly supported by findings showing that the hypnotist may give suggestions for *increased* willpower, effort, freshness and alertness, for instance, in active-alert hypnosis (Banyai & Hilgard, 1976), and research tracking changes in agency over the timespan of a hypnotic suggestion (Polito et al., 2014). In investigating experimental manipulation (or therapeutic modification) of the sense of agency, it is important to assess both the overt behavior and the subjective experiences of the subjects (Költő, 2012).

The current findings demonstrate that the phenomenology of the hypnotic state is more complex and multifaceted than a simple context of reduced volition (Pekala et al., 2010a, 2010b). Associations between SOARS subscales and the PCI dimensions *Altered Experience*, *Self-Awareness*, and *Altered State of Awareness*, showed that individuals who experienced changes in agency were more likely to experience general alterations in their experience during hypnosis, and these relationships were mostly independent of their hypnotic susceptibility. Specifically, alterations in agency under hypnosis were strongly associated with a lowered sense of self-awareness and with a feeling that hypnosis is an unusual state of consciousness.

We also found five additional relationships between specific aspects agency change and other dimensions of conscious experience. First, *Positive Affect* was associated with increased *Involuntariness* and *Effortlessness*, but this association lowered when controlling for hypnotizability. This may indicate that a favorable emotional response toward hypnosis facilitates overall hypnotic experience but is not specifically related to changes in subjective control. Second, we found that agency change was associated with increased *Attention*, and this was particularly true for *Effortlessness*. This fits well with the conceptualization of the PCI *Attention* dimension, which taps increases focused absorption in the task at hand, and supports the notion

that agency alteration in hypnosis may relate to changes in attentional control systems (Lifshitz, Aubert Bonn, Fischer, Kashem, & Raz, 2013). Third, *Arousal* was negatively associated with *Effortlessness*. This supports the characterization of SOARS *Effortlessness* as tapping the passive experience of events as they unfold. Fourth, *Rationality* was negatively associated with *Involuntariness*. This relationship makes sense in light of the content of suggestions in the HGSHS:A. For example, the arm rigidity suggestion instructs participants that their arm will become stiff like a steel rod. This contradicts everyday waking logic and rationality, and may reflect what Orne (1959) described as “trance logic”. Fifth, *Memory* was negatively associated with both SOARS subscales (although only the association with *Involuntariness* persisted when controlling for hypnotizability). This may indicate agency change is specifically associated with a perceived reduction in ability to recall memories, however participants’ memory experiences would likely have been influenced by the specific memory suggestion in the HGSHS:A.

#### 4.3. Differences from the original SOARS study

The current study differed from the original SOARS study in a number of ways. First of all, whereas Polito et al. (2013) used a shortened, 10-item version of the Harvard scale, in the present investigation, the standard 12-suggestion scale was employed. Earlier investigations, carried out with the Stanford Hypnotic Susceptibility Scale, Form C, indicated that such “tailoring” of the scales did not reduce the reliability of the measures (Hilgard, Crawford, Bowers, & Kihlstrom, 1979).

Second, in the original study, hypnosis was administered using an MP3 recording. In the present study, the experimenters delivered live hypnosis. This leads us to the general methodological question of whether tape or live administration methods in experimental and therapeutic hypnosis are interchangeable. Findings on this question are mixed. Effectiveness of hypnotic suggestions for relaxation seem to be mode-independent (Paul & Trimble, 1970). On the other hand, live presentation of the Stanford Clinical Scale produced a significantly higher total score in a sample of hospitalized pain patients than the taped version (Johnson & Wiese, 1979). A meta-analysis of live versus taped hypnotic interventions for surgical patients did not reveal a significant difference in effectiveness (Montgomery, David, Winkel, Silverstein, & Bovbjerg, 2002). However, a further meta-analysis of different suggestive techniques found that live suggestions proved to be more effective in reducing postoperative side effects in surgery patients than those administered via tape (Kekecs, Nagy, & Varga, 2014). In healthy subjects, live or recorded administration of the Barber Suggestibility Scale (BSS, Barber, 1965) did not yield statistically different scores (Barber & Calverley, 1964). This finding was replicated in a more recent study (Fassler, Lynn, & Knox, 2008), using the Carleton University Responsiveness to Suggestions Scale (CURSS) (Spanos et al., 1983). In our own lab, administration of HGSHS:A live or via audiotape did not lead to significant difference in susceptibility scores; neither in measures of archaic involvement and phenomenological dimension of hypnosis (Bányai, 2008). These results, and the current findings, suggest that live versus audio-taped administration of HGSHS:A does not lead to a difference in hypnotizability scores. It has to be noted, however, that large-sample comparative studies are needed to confirm that in experimental situations with healthy participants, mode of administration does not lead to a difference in hypnotic responsiveness.

#### 4.4. Conclusion

This study showed that the SOARS-HU is a valid adaptation of the SOARS to the Hungarian language. This measure provides a new way to quantify experiences of agency in this population and will allow future cross cultural comparisons of the subjective aspects of hypnosis. Although changes in subjective control have long been recognized as a defining feature of hypnosis, here we extended the original SOARS findings to show that changes in the sense of agency do not occur in isolation but are part of a broad range of alterations in conscious experience that occur in the context of hypnosis. Importantly, the relationships identified between agency changes and other dimensions of conscious experience were, for the most part, robust, even when controlling for the behavioral aspect of hypnotizability. This implies that agency change, in and of itself, may involve changes in experience beyond the domains of perceived volition and subjective control. These results support a conceptualization of sense of agency as a complex multidimensional construct that is experienced through a range of alterations in consciousness across the full range of hypnotizability. Two important directions for future research are (1) to use the SOARS measures to evaluate how specific hypnotherapeutic suggestions change clients’ perceived agency; and (2) to investigate whether this characterization of agency change is also applicable to contexts outside of hypnosis.

#### Acknowledgements

We thank our reviewers and Professor Katalin Varga, PhD (Eötvös Loránd University, Hungary), for their valuable comments on the manuscript; Honorary Associate Professor Anna C. Gósi-Greguss, PhD (Eötvös Loránd University, Hungary), for her help in the translation process of SOARS-HU; and Professor Éva I. Bányai, PhD (Eötvös Loránd University, Hungary), for taking part in the investigations as a hypnotist.



This research was supported through the New National Excellence Program of the Ministry of Human Capacities, Hungary (ÚNKP 16-4).



## References

- Bányai, É. I. (2008). A hipnózis szociál-pszichobiológiai modellje [The social-psychobiological model of hypnosis]. In É. Banyai & L. Benczúr (Eds.), *A hipnózis és a hipnoterápia alapjai [the foundations of hypnosis and hypnotherapy]* (pp. 379–445). Budapest, Hungary: ELTE Eötvös Kiadó.
- Banyai, E. I., & Hilgard, E. R. (1976). Comparison of active-alert hypnotic induction with traditional relaxation induction. *Journal of Abnormal Psychology*, 85(2), 218–224. <http://dx.doi.org/10.1037/0021-843X.85.2.218>.
- Barber, T. X. (1965). Measuring “hypnotic-like” suggestibility with and without “hypnotic induction”: Psychometric properties, norms, and variables influencing response to the Barber Suggestibility Scale (BSS). *Psychological Reports*, 16(3), 809–844. <http://dx.doi.org/10.2466/pr0.1965.16.3.809>.
- Barber, T. X., & Calverley, D. S. (1964). Comparative effects on “hypnotic-like” suggestibility of recorded and spoken suggestions. *Journal of Consulting Psychology*, 28, 384. <http://dx.doi.org/10.1037/h0045217>.
- Bernheim, H. (1891). *Hypnotisme, suggestion, psychothérapie: Etudes nouvelles*. Paris: Doin.
- Bowers, K. S. (1981). Do the Stanford scales tap the “classic suggestion effect”? *International Journal of Clinical and Experimental Hypnosis*, 29(1), 42–53. <http://dx.doi.org/10.1080/00207148108409142>.
- Bowers, P. (1982). The classic suggestion effect: Relationships with scales of hypnotizability, effortless experiencing, and imagery vividness. *International Journal of Clinical and Experimental Hypnosis*, 30(3), 270–279. <http://dx.doi.org/10.1080/00207148208407264>.
- Bowers, P., Laurence, J.-R., & Hart, D. (1988). The experience of hypnotic suggestions. *International Journal of Clinical and Experimental Hypnosis*, 36(4), 336–349. <http://dx.doi.org/10.1080/00207148808410523>.
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). New York, USA: Guilford Press.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications and programming*. New York, USA: Routledge, Taylor and Francis Group.
- Fassler, O., Lynn, S. J., & Knox, J. (2008). Is hypnotic suggestibility a stable trait? *Consciousness and Cognition*, 17(1), 240–253. <http://dx.doi.org/10.1016/j.concog.2007.05.004>.
- Gallagher, S. (2000). Philosophical conceptions of the self: Implications for cognitive science. *Trends in Cognitive Sciences*, 4(1), 15–31. <http://dx.doi.org/10.1016/j.newideapsych.2010.03.003>.
- Gallagher, S. (2012). Multiple aspects in the sense of agency. *New Ideas in Psychology*, 30(1), 15–31. <http://dx.doi.org/10.1016/j.newideapsych.2010.03.003>.
- Hilgard, E. R. (1965). *Hypnotic susceptibility*. Oxford, England: Harcourt, Brace & World.
- Hilgard, E. R., Crawford, H. J., Bowers, P., & Kihlstrom, J. F. (1979). A tailored SHSS-C, permitting user modification for special purposes. *International Journal of Clinical and Experimental Hypnosis*, 27(2), 125–133. <http://dx.doi.org/10.1080/00207147908407552>.
- Holm, S. (1979). A simple sequentially rejective multiple test procedure. *Scandinavian Journal of Statistics*, 6(2), 65–70. <http://dx.doi.org/10.2307/4615733>.
- Iglesias, A. (2003). Hypnosis as a vehicle for choice and self-agency in the treatment of children with trichotillomania. *American Journal of Clinical Hypnosis*, 46(2), 129–137. <http://dx.doi.org/10.1080/00029157.2003.10403583>.
- Johnson, L. S., & Wiese, K. F. (1979). Live versus tape-recorded assessments of hypnotic responsiveness in pain-control patients. *International Journal of Clinical and Experimental Hypnosis*, 27(2), 74–84. <http://dx.doi.org/10.1080/00207147908407548>.
- Józsa, E. (2012). *Diádikus interakciós élménymintázatok [Patterns of dyadic interactional experiences]* Doctoral (PhD) dissertation. Budapest, Hungary: Eötvös Loránd University.
- Kekecs, Z., Nagy, T., & Varga, K. (2014). The effectiveness of suggestive techniques in reducing postoperative side effects: A meta-analysis of randomized controlled trials. *Anesthesia & Analgesia*, 119(6), 1407–1419. <http://dx.doi.org/10.1213/ane.0000000000000466>.
- Költő, A. (2012). *Ágencia és hipnózis [Agency and hypnosis]*. In K. Varga & A. Gösiné Greguss (Eds.), *Tudatállapotok, hipnózis, egymásra hangolódás: Tisztelegő kötet Prof. Banyai Éva 70. születésnapja alkalmából [States of consciousness, hypnosis, mutual attunement: Salutation for Prof. Éva Banyai's 70th birthday]* (pp. 339–374). Budapest, Hungary: L'Harmattan Kiadó.
- Költő, A. (2015). *Hypnotic susceptibility and mentalization skills in the context of parental behavior* Doctoral (PhD) dissertation. Budapest, Hungary: Eötvös Loránd University. Retrieved from <<http://www.tinyurl.com/koltophd>>.
- Költő, A., Gösi-Greguss, A. C., Varga, K., & Banyai, É. I. (2013). A Harvard Hipnabilitási Csoportskála faktorszerkezete [The factor structure of the Harvard Group Scale of Hypnotic Susceptibility]. Paper presented at the A Magyar Pszichológiai Társaság XXII. Országos Tudományos Nagygyűlése [XXII Scientific Convention of the Hungarian Psychological Association], Budapest, Hungary.
- Költő, A., Gösi-Greguss, A. C., Varga, K., & Banyai, É. I. (2015). Hungarian norms for the Harvard Group Scale of Hypnotic Susceptibility, Form A. *International Journal of Clinical and Experimental Hypnosis*, 63(3), 309–334. <http://dx.doi.org/10.1080/00207144.2015.1031549>.
- Kumar, V. K., & Pekala, R. J. (1988). Hypnotizability, absorption, and individual differences in phenomenological experience. *International Journal of Clinical and Experimental Hypnosis*, 36(2), 80–88. <http://dx.doi.org/10.1080/00207148808409332>.
- Lifshitz, M., Aubert Bonn, N., Fischer, A., Kashem, I. F., & Raz, A. (2013). Using suggestion to modulate automatic processes: From Stroop to McGurk and beyond. *Cortex*, 49(2), 463–473. <http://dx.doi.org/10.1016/j.cortex.2012.08.007>.
- Maitz, E. A., & Pekala, R. J. (1991). Phenomenological quantification of an out-of-the-body experience associated with a near-death event. *OMEGA – Journal of Death and Dying*, 22(3), 199–214. <http://dx.doi.org/10.2190/2A72-UV9B-65EC-56P5>.
- Maurer, R. L., Kumar, V. K., Woodside, L., & Pekala, R. J. (1997). Phenomenological experience in response to monotonous drumming and hypnotizability. *American Journal of Clinical Hypnosis*, 40(2), 130–145. <http://dx.doi.org/10.1080/00029157.1997.10403417>.
- McConkey, K. M., & Barnier, A. J. (2004). High hypnotizability: Unity and diversity in behaviour and experience. In M. Heap, R. J. Brown, & D. A. Oakley (Eds.), *The highly hypnotizable person: Theoretical, experimental and clinical issues* (pp. 61–84). Hove, UK: Brunner-Routledge.
- McConkey, K. M., Barnier, A. J., Maccallum, F. L., & Bishop, K. (1996). A normative and structural analysis of the HGSHS: A with a large Australian sample. *Australian Journal of Clinical and Experimental Hypnosis*, 24, 1–11.
- Montgomery, G. H., David, D., Winkel, G., Silverstein, J. H., & Bovbjerg, D. H. (2002). The effectiveness of adjunctive hypnosis with surgical patients: A meta-analysis. *Anesthesia & Analgesia*, 94(6), 1639–1645. <http://dx.doi.org/10.1213/00000539-200206000-00052>.
- Muthén, L. K., & Muthén, B. O. (2007). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.
- Orne, M. T. (1959). The nature of hypnosis: Artifact and essence. *Journal of Abnormal and Social Psychology*, 58(3), 277–299. <http://dx.doi.org/10.1037/h0046128>.
- Paul, G. L., & Trimble, R. W. (1970). Recorded vs. “live” relaxation training and hypnotic suggestion: Comparative effectiveness for reducing physiological arousal and inhibiting stress response. *Behavior Therapy*, 1(3), 285–302. [http://dx.doi.org/10.1016/S0005-7894\(70\)80108-3](http://dx.doi.org/10.1016/S0005-7894(70)80108-3).
- Pekala, R. J. (1982). *The phenomenology of consciousness inventory*. Thorndale, Philadelphia, USA: Psychophenomenological Concepts.
- Pekala, R. J. (1991). *Quantifying consciousness: An empirical approach*. New York, USA: Plenum Press.
- Pekala, R. J., & Ersek, B. (1993). Firewalking versus hypnosis: A preliminary study concerning consciousness, attention, and fire immunity. *Imagination, Cognition and Personality*, 12(3), 207–229. <http://dx.doi.org/10.2190/J703-N7H8-KMGL-ODLG>.
- Pekala, R. J., Kumar, V. K., Maurer, R., Elliott-Carter, N., Moon, E., & Mullen, K. (2010a). Suggestibility, expectancy, trance state effects, and hypnotic depth: I. Implications for understanding hypnotism. *American Journal of Clinical Hypnosis*, 52(4), 275–290. <http://dx.doi.org/10.1080/00029157.2010.10401732>.
- Pekala, R. J., Kumar, V. K., Maurer, R., Elliott-Carter, N., Moon, E., & Mullen, K. (2010b). Suggestibility, expectancy, trance state effects, and hypnotic depth: II. Assessment via the PCI-HAP. *American Journal of Clinical Hypnosis*, 52(4), 291–318. <http://dx.doi.org/10.1080/00029157.2010.10401733>.
- Peters, J. E., Dhanens, T. P., Lundy, R. M., & Landy, F. J. (1974). A factor analytic investigation of the Harvard Group Scale of Hypnotic Susceptibility, Form A. *International Journal of Clinical and Experimental Hypnosis*, 22(4), 377–387. <http://dx.doi.org/10.1080/00207147408413017>.
- Polito, V., Barnier, A. J., & Woody, E. Z. (2013). Developing the Sense of Agency Rating Scale (SOARS): An empirical measure of agency disruption in hypnosis. *Consciousness and Cognition*, 22(3), 684–696. <http://dx.doi.org/10.1016/j.concog.2013.04.003>.

- Polito, V., Barnier, A. J., Woody, E. Z., & Connors, M. H. (2014). Measuring agency change across the domain of hypnosis. *Psychology of Consciousness: Theory, Research, and Practice*, 1(1), 3–19. <http://dx.doi.org/10.1037/cns0000010>.
- Polito, V., Langdon, R., & Barnier, A. J. (2015). Sense of agency across contexts: Insights from schizophrenia and hypnosis. *Psychology of Consciousness: Theory, Research, and Practice*, 2(3), 301–314. <http://dx.doi.org/10.1037/cns0000053>.
- Rudski, J. M., Marra, L. C., & Graham, K. R. (2004). Sex differences on the HGSHS: A. *International Journal of Clinical and Experimental Hypnosis*, 52(1), 39–46. <http://dx.doi.org/10.1076/iceh.52.1.39.23924>.
- Sheehan, P. W., & McConkey, K. M. (1982). *Hypnosis and experience: The exploration of phenomena and process*. Hillsdale, USA: Erlbaum.
- Shor, R. E., & Orne, E. C. (1962). *Harvard Group Scale of Hypnotic Susceptibility, form A*. Palo Alto, USA: Consulting Psychologists Press.
- Spanos, N. P., Radtke, H. L., Hodgins, D. C., Bertrand, L. D., Stam, H. J., & Moretti, P. (1983). The Carleton University responsiveness to suggestion scale: Relationship with other measures of hypnotic susceptibility, expectancies, and absorption. *Psychological Reports*, 53(3), 723–734. <http://dx.doi.org/10.2466/pr0.1983.53.3.723>.
- Synofzik, M., Vosgerau, G., & Neven, A. (2008). Beyond the comparator model: A multifactorial two-step account of agency. *Consciousness and Cognition*, 17(1), 219–239. <http://dx.doi.org/10.1016/j.concog.2007.03.010>.
- Szabó, C. (2003). The effect of monotonous drumming on subjective experiences. Presented at the 5th triennial ESCOM conference, Hannover University of Music and Drama.
- Terhune, D. B., Polito, V., Barnier, A. J., & Woody, E. Z. (2016). Variations in the sense of agency during hypnotic responding: Insights from latent profile analysis. *Psychology of Consciousness: Theory, Research, and Practice*, 3(4), 293–302. <http://dx.doi.org/10.1037/cns0000107>.
- Varga, K. (2013). *The phenomenology of hypnotic interactions*. New York, USA: Nova Publishers Inc.
- Varga, K., Bányai, É. I., Gósi-Greguss, A. C., & Tauszik, K. (2013). Phenomenological aspects of hypnotic interactions: The effect of kinship. *International Journal of Clinical and Experimental Hypnosis*, 61(4), 401–415. <http://dx.doi.org/10.1080/00207144.2013.810476>.
- Varga, K., Jozsa, E., Banyai, E. I., Gosi-Greguss, A. C., & Kumar, V. K. (2001). Phenomenological experiences associated with hypnotic susceptibility. *International Journal of Clinical and Experimental Hypnosis*, 49(1), 19–29. <http://dx.doi.org/10.1080/00207140108410376>.
- Venkatesh, S., Raju, T. R., Shivani, Y., Tompkins, G., & Meti, B. L. (1997). A study of structure of phenomenology of consciousness in meditative and non-meditative states. *Indian Journal of Physiology and Pharmacology*, 41(2), 149–153.
- Weitzenhoffer, A. M. (1974). When is an “instruction” an “instruction”? *International Journal of Clinical and Experimental Hypnosis*, 22(3), 258–269. <http://dx.doi.org/10.1080/00207147408413005>.
- Weitzenhoffer, A. M., & Hilgard, E. R. (1959). *Stanford hypnotic susceptibility scale, forms A and B*. Palo Alto, CA: Consulting Psychologists Press.
- Williamson, A. (2012). Hypnotic phenomena and hypnotizability. In L. Brann, J. Owens, & A. Williamson (Eds.), *The handbook of contemporary clinical hypnosis: Theory and practice* (pp. 19–29). Chichester, UK: John Wiley & Sons Ltd.
- Woody, E. Z., & McConkey, K. M. (2003). What we don't know about the brain and hypnosis, but need to: A view from the Buckhorn Inn. *International Journal of Clinical and Experimental Hypnosis*, 51(3), 309–338. <http://dx.doi.org/10.1076/iceh.51.3.309.15523>.