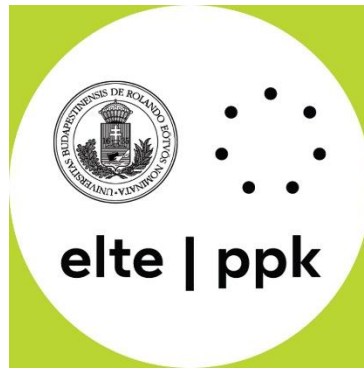


**Eniko Kasos**

**PhD Theses**

**Interactional Synchrony during Active-Alert Hypnosis**



**Doctoral School of Psychology, Eötvös Loránd University**

**Behavioural Psychology Programme**

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"Think twice before you speak, because your words and influence will plant the seed of either success or failure in the  
mind of another."

**Napoleon Hill**

"If the truth contradicts deeply held beliefs, that is too bad."

- **Hans Eysenck**

## Overview

The results presented in this dissertation provide an important insight into active-alert hypnosis (AAH) furthering our understanding of the hypnosis phenomena. They emphasize the corrective experiences provided by hypnotherapy and how its beneficial effects are not dependent on the hypnotizability of the subject. My PhD dissertation highlights the evolutionary value of hypnosis and how it influences development, physical and mental health. The four studies included examine the similarities of AAH comparing it with traditional hypnosis and sport, then examining its hormonal, phenomenological and endocrine aspects within the interactional framework.

In the first study we investigated neuroendocrine indicators whose role in the regulation of social interactions (e.g. parent-child relationships) are supported by a growing body of research. In this research, we have repeated in AAH a previous study conducted by our research team under traditional hypnosis. Because hypnosis is used to repair early relationship trauma, it is important to examine whether neuroendocrine changes occurring in parent-child relationships and other affiliative situations can be observed in different forms of hypnosis.

In the second study we explored the interactional processes through the subjective experiences of the hypnotist and subject. Hypnosis is a uniquely intimate experience and as such, it is hard to examine without the participants' phenomenological experiences. It is a unique feature of this thesis, that in connection with physiological "hard" indicators, we analyse and present subjective data as well.

In the third study through the analysis of electrodermal activity (EDA), we inferred to changes in brain laterality. EDA is much easier to measure and analyse than EEG, less sensitive to motion artifacts and a less expensive peripheral indicator than central markers. Measuring

EDA, we can test one of the most important neurophysiological questions of hypnosis: what happens in the hypnotized subject's brain during hypnosis, is there an objective indicator of hypnosis that distinguishes it from wakefulness or other altered states of consciousness (ASC).

In the fourth study, we compared the altered state of consciousness experienced by solitary runners, participants of group spinning class, subjects of AAH and an awake control with the help of the Phenomenology of Consciousness Inventory (PCI). These findings provide a basis for further research that addresses whether exercise can be a path to greater suggestibility, enhanced performance, and improved interpersonal relationships and communication among team members and between athletes and their coaches.

The unique aspect of these studies, besides their focus on AAH is that they consider both participants of the hypnotic interaction, subject and hypnotist, examining the effect of AAH by subjective and neurophysiological indicators, besides phenomenological indicators analysing changes in the autonomic nervous system and the neuroendocrine system.



*Illustration of traditional (left) and active -alert (right) hypnosis (Bányai, 2018)*

## Introduction

**Interactional synchrony:** Our affinity for synchronization is an innate ability, it plays a role in harmonizing the groups emotional state, behaviour, and fosters cooperation. Because this is evolutionarily advantageous, synchronization has strong rewarding effect. In every culture there are rituals using music or dance or even different games for its synchronizing effect, we may employ clapping similarly, or even the “wave” at sporting events (Buda, 2012; Csányi, 2016; Levenson & Ruef, 1997).

The absence of interactional synchrony may indicate depression (Bouhuys & Sam, 2000), and its adaptive value is evident throughout our development. There is evidence emphasizing its influence on attachment and the development of parent-child relationship in early childhood (Feldman, 2003; Harrist & Waugh, 2002; Isabella & Belsky, 1991; Lindsey et al., 2009) as well as in the teenage years (Barber et al., 2001; Lindsey et al., 2008). When testing attachment in one-year old babies, those who showed more synchrony with their mother at 3 and 9 months demonstrated secure attachment. Babies in the insecure-avoidant or insecure-resistant group had mothers who demonstrated less responsiveness during interaction with their babies (Isabella & Belsky, 1991).

**Hypnosis in the interactional framework:** According to Bányai’s social psychobiological model, hypnosis is an altered state of consciousness, established during the interaction between subject and hypnotist, an intense regulatory relationship that is characteristic of close intimate human relationships (Bányai, 1991, 2008b). Hypnosis is the model situation of the interpersonal adaptational processes and can be interpreted as the prototypical setting for peer support (Józsa, 2012). During hypnosis the subjects allows the hypnotist to control the situation, similarly to a parent child relationship (Vandenberg, 1998).

**Oxytocin and hypnosis:** There is a close link between the oxytocin (OT) and dopamine systems as both play an integral part in social relationships (Esch & Stefano, 2005), and between hypnotizability and COMT (catechol-O-methyltransferase), one of several enzymes that degrade catecholamines like dopamine (Lichtenberg et al., 2000, 2004; Raz, 2005; Raz et al., 2006; Szekely et al., 2010). Researchers theorized that OT has a positive effect on the rapport between hypnotists and subject and as a result the subject was more inclined to comply with suggestions (Bryant et al., 2012). Varga et al (2014) found that the increases in OT level was connected with the subjects' perceived communion with the hypnotist as measured by the Dyadic Interactional Harmony (DIH) questionnaire (Varga & Kekecs, 2014). At the same time increases in the hypnotists' OT levels were negatively correlated with the subjects' perception of emotional warmth expressed by their parents measured by the s-EMBU (Arrindell et al., 1999).



*Open-source Bio-Monitor (OBIMON) for electrodermal measurement (K. Kasos et al., 2019) used in Study 3.*

**Electrodermal Activity:** Electrodermal activity is often used in psychological research because it is easy to measure and is a trusted method for assessing activity in the sympathetic (SNS) and the parasympathetic (PNS) nervous system (Boucsein, 2012; Boucsein et al., 2012; Kekecs et al., 2016). It is representative of the intensity of a certain emotion not what type it is, as both “positive” (happiness) or “negative” (fear) emotions increase skin conductance. The results of our study along with Kekecs et al (2016) suggest that lower SNS activity was the result of

hypnosis and not the relaxation but interestingly hypnotizability did not seem to play a role in the results (Kekecs et al., 2016). Bilateral electrodermal measures taken during AAH indicate that high hypnotizable subjects during induction demonstrate a shift to right hemispheric dominance, as opposed to low hypnotizables who demonstrate left hemispheric activation, causing electrodermal dominance on the left side (Gruzelier & Warren, 1993). This seems to support the idea, that the left frontal activation, demonstrated by highly hypnotizable subjects corresponds with right posterior dominance with inhibition in the left (Gruzelier, 1996) while in low hypnotizables the activation of left hemispheric attentional networks is generated by the verbal processing of the hypnotist's words and suggestions regarding focused attention (Rainville et al., 1999). Cognitive flexibility, the ability to respond to environmental changes is linked to hypnotizability (Crawford & Allen, 1983), explaining how high hypnotizable subjects are able to switch between effortful and effortless attention during hypnosis promoting deeper absorption (Crawford et al., 1993).

**Altered State of Consciousness and Sport:** Many people who exercise report experiencing changes in consciousness (Chavez, 2008), describing feeling in control, effortless focused attention, less anxiety, and being able to move easily (Ravizza, 1977). These experiences, indicating an alteration in consciousness are similar to those expressed by participants of AAH (Bányai, 1987). Why is it important to draw parallels between states of consciousness during hypnosis and sport activities? Some individuals become highly suggestible during hypnosis and increased suggestibility is often associated with ASC (John F Kihlstrom, 2008). Studies have linked spontaneously occurring ASC during emergencies with increased suggestibility, and in these altered states positive and negative suggestions have a profound effect on people (Kekecs & Varga, 2011, 2013; Szilágyi et al., 2007, 2014; Varga et al., 2013). ASC, both in flow state and AAH, has a documented positive effect on sport performance, via reduced

anxiety, and enhanced performance and cooperation (Bányai et al., 1993; Chavez, 2008; Robazza & Bortoli, 1994; Stein et al., 1995). Negative communication may influence performance and anxiety through the suggestions itself or by interrupting the exercisers' altered state. Similar changes in conscious awareness during exercise and hypnosis context would make a strong case that during exercise susceptibility to suggestions may similarly increase. This parallel would mean that the quality of communication among coaches and athletes or teammates has profound importance and maintaining ASC during exercise or competition may have significant benefits.

Sensitive, conscious communication is essential, especially during a game or when exercisers train. Although ASC during exercise is not negative as it usually is during medical procedures the presence of ASC supports the notion that suggestibility may also be increased. Utilizing the increased suggestibility through positive communication can be a valuable tool and a relatively simple way that can reduce competitive and performance anxiety, fatigue, increase performance, even improve synchrony between teammates or coach and athlete.



## Studies 1 and 2

In Studies 1 and 2 thirty-one adult females (mean age:  $23.28 \pm 3.54$  years) and five female hypnotherapists (mean age:  $54.2 \pm 11.43$  years) participated. Prior to the research, the subjects' hypnotisability was measured using the Hungarian version of the Harvard Group Scale of Hypnotic Susceptibility (Költő et al., 2015; Shor & Orne, 1963). Each hypnotist worked with two low (1-6) and two high (7-12 points) hypnotizable subjects. Before their appointment participants filled out the State-trait Anxiety Inventory (STAI) (Spielberger et al., 1970) and the first saliva samples were collected for the hormonal measurements. After the hypnosis, subjects finished their Stanford booklets, and both participants filled out the required tests in the following order: AIM, PCI, DIH, STAI-s, STAI-t, and s-EMBU.

The most interesting hormonal result in Study 1 was that OT levels of high hypnotisable subjects decreased during hypnosis, of those with low hypnotisability increased, while those with moderate hypnotisability remained unchanged. Clinical hypnotherapists have found that the clients' hypnotisability (as measured by behavioural scales) does not predict the effectiveness of therapy if the client is motivated to change and willing to cooperate (Barabasz et al., 2010). The results of our research also support the idea that subjects who do not exhibit observable behavioural responses can experience the beneficial effects of hypnosis.

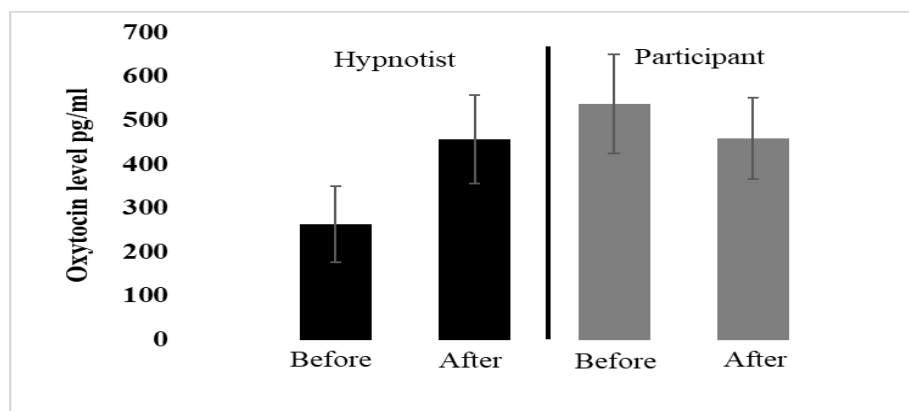
Subjects scored significantly higher on altered experience, body image, time sense, perception, meaning, attention, direction, altered state of awareness, and the internal dialogue scales. This is in line with what one would expect in the situation, since changes in consciousness, flow of time, perception, dissolved body boundaries, stronger inner-focused attention, and more inner silent talk are characteristic of hypnosis (Pekala et al., 1986).

At the same time hypnotists scored significantly higher on the PCI scales of self-awareness, rationality, volitional control, and memory. This pattern of consciousness is more

similar to the alert state, shows clearer, more logical thinking, feeling of deliberate control of thinking and attention, and clearer memories. These results again support the notion that the participants' role influenced their subjective experience. Hypnotists – as expected resulting from their role in the AAH situation – remained more in control, reporting less alterations in their consciousness.

Subjects with higher OT levels after hypnosis scored lower on the *altered state of awareness*, higher on self-awareness and reported less distortion of *time sense*, *perception* and lower *concentration* and *vividness of imagery*. These results seem to indicate that the interactional effects of hypnosis activate the OT system in subjects otherwise less involved (at the behavioural level) in hypnosis. This important result seems to confirm that hypnosis can have a beneficial effect at the hormonal level on low hypnotizables.

By measuring hormonal changes in participants during hypnotic interaction we can better comprehend the (reciprocal) regulation of OT and cortisol levels in participants, as well as indirectly infer how during hypnotherapy and other psychotherapeutic methods utilizing ASC the correction of negative experiences, the support of defence and coping mechanisms, the strengthening of the client's self and the mobilisation of resources are achieved.



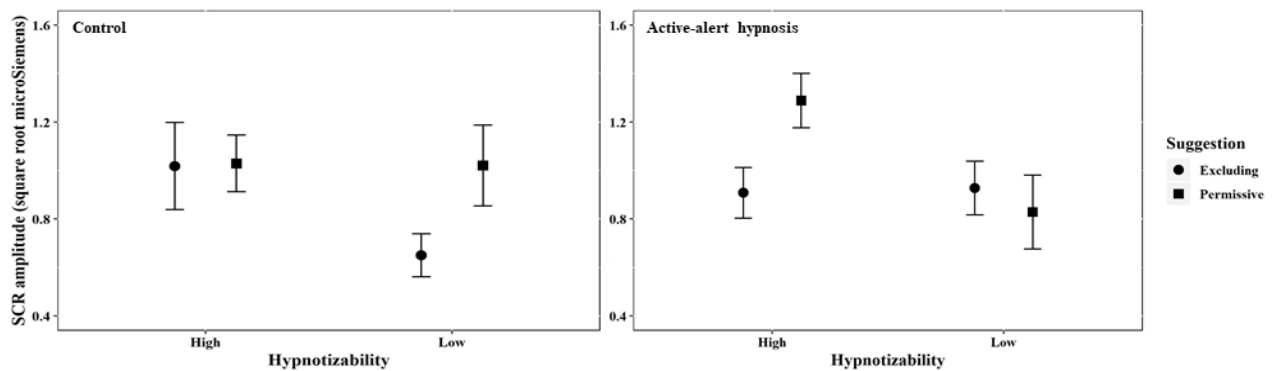
*Oxytocin levels before and after hypnosis in the hypnotist and subject.*

*Y error bars represent  $\pm$  one standard error the mean.*

### Study 3

In the 3. study, thirty-two adults (mean age:  $29.51 \pm 9.74$  yrs, 36.5% women) participated in two experimental conditions (hypnosis and music) in random order, on the same day, with at least half an hour rest between the two. Only those with low (1-4 points) or high (8-12 points) hypnotisability, assessed previously during group hypnosis, were invited to participate in the study. EDA was measured using the OpenEDA open-source 4 Hertz sampling rate biomonitor (Kekecs et al., 2016), that was fixed on the right and left shoulder (van Dooren et al., 2012).

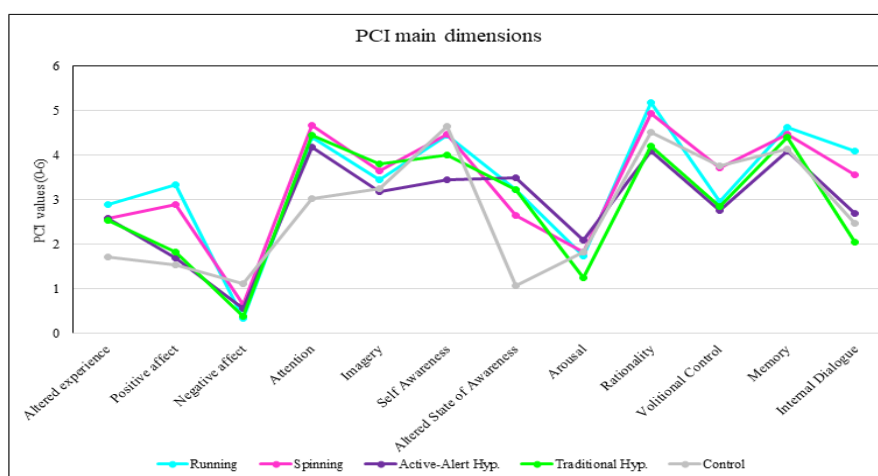
Our results revealed that both low and high hypnotizables responded to suggestions but in different conditions. As we would expect, high hypnotizables responded to suggestions during hypnosis, while low hypnotizables did not show significantly different reaction after either *permitting* or *excluding* suggestions in this condition. On the other hand, low hypnotizables showed suggestion-specific responses during the control condition.



SCR amplitudes in response to the first standard computer-generated tone in the control and hypnosis condition. Error bars represent one standard error of the mean.

## Study 4

In Study 4, we compared subjective experiences of individual runners, participants of group spinning class and individual AAH participants, regarding how altered state of consciousness measured by the PCI compares across the different situations, focusing on *altered experience, altered state of awareness, rationality, self-awareness* and *volitional control* (Farthing, 2008; Varga et al., 2014). Results of the current work demonstrate that young adult participants' retrospective recall of earlier exercise experiences reflected an ASC. As measured by dimensions of the PCI, these *altered experiences* were comparable to the experiences reported by highly hypnotizable subjects who had undergone AAH.



*Participants average scores on the PCI main dimensions in the 5 different conditions*

ASC during hypnosis is associated with increased suggestibility, which may also be the case in exercise-related ASC (John F Kihlstrom, 2008) and thus enhance the influence of communication between athletes and coaches or teammates. ASC, both in flow states and AAH, has a documented positive effect on sport performance, via reduced anxiety, and enhanced cooperation (Bányai et al., 1993; Chavez, 2008; Robazza & Bortoli, 1994; Stein et al., 1995). Other possible advantages of ASC during exercise are better focus of attention, decreased anxiety and higher performance.

## Discussion

AAH is a psychotherapeutic method popular in most countries, especially in Hungary (Biró, 2012). During traditional hypnosis both participants were in a similar, seated position, facing each other, while during AAH the hypnotist was standing still, while the subjects exerted effort pedalling the ergometer in a seated position. The subject was also facing away from the hypnotist, who was standing next to the ergometer. In spite of the different levels of activity, body position and role of the participants, it was AAH that motivated Éva Bányai, to formulate the social-psychobiological theory of hypnosis (Bányai, 2018), and consider hypnosis within the interactional framework.

Indicators of interactional synchrony during AAH as indicated by our results show differences when compared to those measured during traditional hypnosis. This difference may be due to the fact, that there were only female participants in Study 1 and 2 and that may have influenced the hypnosis style (Kasos et al., 2018). At the same time, traditional and AAH is characterized by different hypnosis styles as well. Bányai et al. (1990) described two distinct hypnosis styles – physical-organic (paternal style) and analytic-organic (maternal style), observed during traditional hypnosis (Bányai et al., 1990). During AAH, there seem to be a more equal relationship, a friend-like style (Bányai, 2008a, 2018) or a sibling-like style (Varga & Kekecs, 2015). It is possible, that for those low hypnotizables, who have a harder time being absorbed in the hypnotic experience, and who may even resist allowing the hypnotist to take control, have an easier time experiencing hypnosis when they feel more equal to the hypnotist. Future research may focus on the influence of hypnosis style on the different physiological and phenomenological indicators.

During AAH negative correlation was discovered between the father protectiveness subscale of subjects' s-EMBU, and the hypnotists' OT change (Kasos et al., 2018). Based on the results from the traditional hypnosis we expected a negative correlation between the subjects' emotional warmth toward their parents expressed on the s-EMBU and the increase of the hypnotists' OT (Varga & Kekecs, 2014). This result is maybe one of the strongest from an interactional standpoint. It could be construed that hypnosis is an explanatory model for the regulation of social connections, subjects bring their more formative relationship representations into the hypnosis situation and the hypnotist seem to react on a hormonal level.

Hypnotizability was an important individual factor that we hoped will help explain the differences in participants' responses because based on previous studies it is generally a predictor of how "well" or how strong participants react to suggestions after induction (Bryant et al., 2012; Költő et al., 2014; Milling et al., 2010; Orne, 1959; Piccione et al., 1989; Szekely et al., 2010; Weitzenhoffer & Hilgard, 1962) and often under non-hypnotic circumstances (J. F. Kihlstrom, 2016). While the predictive effect of hypnotizability in case of certain medical conditions has been proven (De Pascalis, 1999; Ewin, 1986; Hammond, 2010; Hilgard & Hilgard, 1975; Margolis & De Clement, 1980; Olmsted et al., 1982; Smith et al., 1996), most clinical hypnotherapists do not pay much heed to hypnotizability, as measured by hypnotizability scales, often skipping any kind of measurement all together (Varga, 2008).

During AAH, based on changes in OT, we discovered three distinct group of subjects, who showed significant difference in their susceptibility to hypnosis. The OT levels of high hypnotizables decreased, while low hypnotizables showed increase and the OT level of the third - medium hypnotizable- group showed no change pre- to post hypnosis (Kasos et al., 2018).

This surprising result was the first throughout my PhD research that seem to highlight the role hypnotizability plays in how participants respond to hypnosis and started to highlight a

pattern that appears throughout these studies. While low hypnotizables may not give overt behavioural response to suggestions, it does not mean they do not respond to in some way. Under some circumstances building positive rapport, trust in the hypnotist, trust in the hypnosis situation may play a role as well. This may be an explanation of why in some clinical settings, hypnotic susceptibility is not really a predictor of clinical effectiveness (Barabasz et al., 2010). Besides the motivation of the client, the interaction, the rapport that develops between client and hypnotists may be a stronger factor.

**General Conclusion:** The present PhD dissertation consists of 4 studies, examining different aspects of the AAH, within the interactional framework. Studies 1,2 and 3 examined AAH from an endocrinological, a phenomenological and electrodermal perspective. Study 4 explored whether there is altered state of consciousness during solitary running and group spinning exercise, and if the altered state is comparable to the one high hypnotizables experience during AAH.

Few studies have been published on the subject of AAH. The studies presented here are important in that they examine the effects of AAH using subjective and neurophysiological indicators, in addition to the experience, analysing changes in the autonomic nervous system and the neuroendocrine system. A unique feature is that in connection with physiological, "hard" indicators we analyse and present subjective data. A further important feature is that, in line with the social-psychobiological approach to hypnosis, we are the first hypnosis research group in the world to investigate both participants of the active-alert hypnotic interaction.

The most important results of the presented studies are that the beneficial effect of hypnosis can be accessible for low hypnotizable subjects as well and that interactional synchrony, the social connection achieved during hypnosis may be the driving factor behind the corrective effects of hypnosis.

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