Hypnosis and Sleep: the Control of Altered States of Awareness

Frederick J. Evans Ph.D.

In spite of some obvious phenomenological similarities between hypnosis and sleep, they appear to be unrelated physiologically. Hypnosis and sleep may share control mechanisms that may partly account for individual differences in the ability to experience hypnosis and in the ease of falling asleep and maintaining voluntary control of sleep processes. Relationships between hypnosis, napping sleep induced response to suggestion, absorption and treatment outcome are discussed to highlight individual differences in the ability to process and voluntarily control states of consciousness. (Sleep and Hypnosis 1999;4:232-237)

Key Words: sleep induced behavioral response, hypnosis, napping, control of sleep

HYPNOSIS AND SLEEP: SIMILARITIES AND DIFFERENCES

Phenomenological Similarities

If he had not witnessed the induction procedure, the casual observer might well believe a typical hypnotized subject was asleep. It was this sleeplike appear-ance that led Braid to coin the term "hypnosis" from the Greek hypnos (to sleep) and "somnambulist" from the Latin *somnus* (sleep) and *ambulare* (to walk), to describe the deeply hypnotized person.

There are indeed many phe-nomenological parallels between sleep and hypnosis. Not only does the deeply hypnotized individual often appear to be asleep; he may subsequently describe the experience as sleeplike. When awaking from either condition, the person often remembers little of what has transpired. Like the sleepwalking somnam-bulist, the hypnotized person may move about and talk, and he/she maintains con-tact with selected aspects of the external world. Vivid dreams may occur in both sleep and hypnosis. The long historical association between hypnosis and sleep is still reflected in many of the standard induction suggestions that subjects should enter into a deep, relaxed, restful sleep.

From the Pain Management Behavioral Medicine Services Reading Medical Center, Pa Medical Center of Princeton, NJ
Pain Care Center, Philadelphia, Pa Back Rehab Institute, NJ, USA.

Address reprint requests to: Frederick J. Evans Ph.D Pain Management Behavioral Medicine Service, 736 Lawrence Road, Lawrenceville, NJ, 08648 USA Phone and Fax: 609 637 071
E-mail: Aussie Dr@AOL.COM

I wish to thank George Strobel and Melissa Derby for their support and comments.

Accepted November 2, 1999

The Physiological Relationship Between Hypnosis and Sleep

In a previous review (1), some aspects of the possible relationship between hypnosis and sleep were examined. The research literature indicates that there are no basic similarities between hypnosis and sleep in terms of the well-documented EEG characteristics that typically define sleep (2). Hypnosis is characterized by waking EEG patterns; not those of sleep.

The review also summarized earlier studies showing that hypnotizability may be related to the ability possessed by some individuals to respond, even while remaining asleep, to meaningful environmental stimuli that are presented exclusively during sleep. Thus, some hypnotizable individuals can respond while sleeping (particularly in stage REM sleep) to behavioral suggestions adminis-tered during conservatively monitored EEG defined sleep without having any awareness of their response in the subse-quent waking state. Nevertheless, these individuals are able to maintain the response during sleep the next night, or even six months later (3,4).

Other hypnotizable subjects have been able to recognize some simple, paired-associate material presented during REM sleep, provided that an appropriate suggested set is established prior to sleep (5). In general, those subjects

who are able to experience dissociative hypnotic phenomena appear to be able to maintain contact with their external environment and are even able to respond to it without their responses necessarily disturbing their sleep (monitored by conservative EEG criteria).

The sleep-responsive subjects (who were highly hypnotizable) reported that they normally fall asleep easily and quickly, sleep without being disturbed by noise or light, and awaken easily in the morning to a significantly greater extent than the unresponsive subjects awaken. This was supported by the EEG sleep data, since these same sleep-responsive and highly hypnotizable subjects also seemed to sleep more soundly whenever they were stimulated during the night, and they fell asleep more rapidly in the laboratory than did sleep non responsive low hypnotizable sub-jects. Thus, it appears that there may have been an underlying ability whereby these subjects could maintain some kind of cognitive control over their own sleep processes.

The observation that highly hypnotizable subjects fall asleep in a sleep laboratory by EEG criteria significantly more quickly than low hypnotizable subjects (N= 19, $p < .05$) (1,4) provides some empirical support for the historical association between sleep and hypnosis., The somnambulistic sleeplike state studied by Braid (5) was already quite different in appearance from animal magnetism as practiced by Mesmer (6). Nevertheless, for Mesmer, sleep was an important aftereffect of the crises, or hysterical seizures, that were associated with his patients recovery from their illness.

Other incidental observations also suggest that there is an easy and flexible interchangeability of the two states. If the hypnotized subject is left alone, or if specific suggestions are given, the subject may pass into a natural sleep. Similarly, given appropriate suggestions, the sleeping subject may sometimes awaken directly into a hypnotic state rather than a normal waking state (7). Whether the individual is in a sleep, hypnotic, or normal state at a given time may depend upon how he perceives what he is expected to do. In two studies (8,9) in which tape-recorded hypnosis sessions were "inadvertently" terminated by a power failure, deeply hypnotized subjects seemed to slowly terminate hypnosis after a period of about 20 minutes. Surprisingly, after a few minutes of activity several of these subjects appeared to fall asleep in a defensive reaction to the inexplicable disappearance of the hypnotist a behavior not observed in low hypnotizable, simulating subjects.

These anecdotal and empirical observations seem to point to the conclusion that hypnotizable subjects may be able to fall asleep easily and, in general, may possess an ability to maintain control over sleep processes and cognitive activity associated with sleep.

THE CONTROL OF SLEEP: A DIMENSION OF SUBJECTIVE SLEEP PATTERNS

A factor analytic investigation was conducted of responses to a sleep questionnaire that has routinely been used in our laboratory to explore some of the parameters of subjects typical sleep habits (10). In that study, five independent clusters of items were isolated and replicated in two samples (92 and 180 subjects). The largest contribution to reliable variance was made by a dimension involving *dream recall*, including questions about dreams every night, dreams about daytime happenings, and dreams in color. Two separate dimensions seemed to involve different kinds of sleep problems. The first, *sleep-onset difficulty,* included difficulty in falling asleep, takes sleep medication, nights of dreamless sleep, and trouble sleeping before an exam. The second, *inability to maintain sleep,* involved awakens at sounds, often wakes up during the night, has to get up at night, and is a light sleeper. The intriguing possibility that these two dimensions represent normal manifestations of the more extreme sleep-onset insomnia and sleep-maintenance insomnia often noted in the dif-ferential diagnosis of depression and anxiety still need to be explored. Another separate factor apparently involved the *cognitive control of sleep mentation,* including changes of dream content at will, deciding beforehand what to dream about, and awakens to find sound in dream was real. It may be relevant to our earlier work on information processing during sleep.

The most relevant of the five factors for this report was tentatively labeled voluntary *Control of Sleep*. Related questions included items involving falling asleep easily, taking daytime naps, going to sleep at will, and falling asleep during a movie or a concert, or on a plane or train trip. Subjects who score higher on the *Control of Sleep* factor report that they fall asleep more quickly at night than those with low scores do. This finding has been confirmed by EEG criteria of sleep onset in two studies (4,10), one involving nighttime sleep (N= 19), and one involving habitual nappers and non-nappers (N= 33) who were asked to take a laboratory nap. In addition, nappers (who score high on the *Control of Sleep* dimension) report that they are more likely to delay going to bed at night, particularly if their schedule permits a nap either before or after their late nights. They and generally go to bed at more variable times than nonnappers (who score lower on the *Control of Sleep* dimension).

CONTROL OF SLEEP AND HYPNOTIC RESPONSIVITY

In our previous research, there were relatively few significant correlations between the 33 items on the sleep questionnaire discussed above and responsiveness to hypnosis. However, the conceptual framework provided by the factor analytic study, and particularly the notion of individual differences in the degree of control over the sleep processes, suggested a more direct analysis. In Table 1, mean scores on the Harvard Group Scale of Hypnotic Suscepti-bility, Form A (HGSHS:A, 12) are presented for volunteer college student subjects who scored in approximately the upper and lower quartile of the *estimated Control of Sleep* factor scores. Data are reported for a sample of subjects (N = 60) who volunteered for a hypnosis experiment, and also for a larger group (N= 372) drawn from three separate hypnosis studies in which subjects volunteered initially for psychological and psychophysiological study.

Table 1. HGSHS: A scores of Ss with high and low control of sleep (CS)

	Sample 1		Sample 2	
	N	Mean	N	Mean
High CS	17	7.9	124	6.7
LOW CS	13	4.6	89	6.0
t (p<)	3.16	(<0.005)	2.03	(<0.05)

Table 2. Hypnotizability and control of sleep
(Q: Do you fall asleep readiliy? Relationship to hypnosis and napping)

	HGSHS: A		
	High (N= 152)	Low (N= 67)	All (N= 219)
Napper (N= 121)	3.81	3.64	3.76
Non-Napper (N= 98)	3.64	3.13	3.48
All Ss	3.74	3.40	3.63

For example, the mean HGSHS: A scores of subjects with high *Control of Sleep* is 7.9, compared to the mean HGSHS: A scores of only 4.6 in subjects with extreme low scores on the *Control of Sleep* factor score (t= 3.16 p<.005). This initial finding has now been replicated in several college student and psychiatric patient samples, discussed below. This same result can also be shown when subjects are categorized in terms of high (9 12) and low (0 4) hypnotizability on HGSHS:A. The mean scores on the Control of Sleep dimension in the initial small sample reported in Table 2 are 14.8 and 12.6, respectively (df= 39, t= 2.29, p < .02). These results, also replicated in several samples, support the predicted relationship between hypnotizability and the voluntary control of sleep.

CONTROL OF SLEEP AND HYPNOTIZABILITY AMONG NAPPERS

One of the main variables defining the dimension is the occurrence of napping. It seemed likely that the nature of the relationship between hypnotizability and the ability to control sleep processes would be clarified during our ongoing research on napping. The positive relationship between habitual napping and hypnotizability has been replicated in several students and patient samples, although napping is not as frequent in non-student populations. Some of the data summarizing this relationship will be presented below. These results highlight the significant and important relationship between hypnotizability, the *Control of Sleep* processes and napping, which is a major maker of the control dimension.

Moderating Effects of Napping and Non-Napping on Hypnotizability and the Control of Sleep

The items concerned with falling asleep easily and quickly at night and the capacity to sleep in circumstances such as a movie theater or a concert represent phenomena that help define the *Control of Sleep* dimension. These subjective experiences were explored in more detail in another questionnaire that was designed to look at the parameters of napping (13). This questionnaire included items ex-ploring in more depth an individuals ability to sleep under unusual circum-stances. A significant relationship between the items that appeared to be related to the control of sleep, the occurrence of napping, and hypnotizability was predicted. The obtained results, however, were more complex, but perhaps more meaningful, than such a simple relationship would imply.

The napping questionnaire was administered to 469 students who had volunteered to participate in a hypnosis experiment. These subjects were divided into 259 nappers (those who reported they napped "sometimes," "usually," or "always") and 210 nonnappers (those who reported napping "rarely" or "never"). A number of items that seemed similar to those in-volving the voluntary *Control of Sleep* in a variety of circumstances had been shown in a prior sample of 430 students to discriminate significantly between nappers and nonnappers, differences which were replicated in the present sample of 469.

Table 3. The moderating effects of being a napper (N= 259) or nonnapper (N= 210) on the relationship between hypnotic susceptibility (HGSHS: A-High= 9-12; Low= 0-4) and subjective sleep questions indicating skill in controlling sleep

	Nonnappers			Nappers			All Ss		
Sleep item (Nap questionnaire)	High (67)	Low (31)	High t	Low (85)	High (36)	Low t	(152)	(67)	t
Could sleep now (Yes=1)	0.63	0.42	1.99*	0.76	0.92	2.08*	0.72	0.69	-
Min. Usually to fall asleep	19.2	28.8	1.90**	18.6	19.2	-	18.9	26.4	2.12***
Time usually to bed (a.m.)	00:41	01:18	1.97**	00:36	00:55	-	00:38	01:06	2.12*
Hr. Sleep regularly	7:15	7:37	1.95**	7:17	7:22	-	7:16	7:30	-
Fall asleep easily	3.64	3.13	2.56***	3.81	3.64	-	3.74	3.40	2.76***
Wake up nights	2.52	2.26	2.21*	2.67	2.72	-	2.61	2.51	-
Difficulty falling asleep	2.33	3.00	3.47****	2.34	2.47	-	2.34	2.72	2.94***
Do you fall asleep:									
Reading book	2.48	1.90	3.07***	2.75	2.97	-	2.63	2.48	-
Studying	2.40	1.94	2.29**	2.64	2.89	-	2.53	2.48	-
Play or theater	1.64	1.23	3.17****	1.73	1.78	-	1.69	1.52	-
Plane or train	2.54	1.90	2.84***	2.86	2.86	-	2.72	2.42	1.92**
Movies	1.97	1.48	3.12***	2.18	2.06	-	2.09	1.79	2.58***
Stress	1.79	1.58	-	2.18	1.86	1.66**	2.01	1.73	2.00*
Lectures, speeches	2.22	2.81	2.35***	2.44	2.61	-	2.34	2.24	-
Watching tv	2.64	2.13	2.17*	2.85	2.61	-	2.76	2.39	3.34****
No of sit. Always diff.	2.45	4.65	3.99****	1.46	1.58	-	1.89	3.00	3.14****
Sleepwalk	1.28	1.16	-	1.32	1.08	3.15****	1.30	1.12	2.88***
Sleeptalk	2.12	1.97	-	2.22	2.00	-	2.18	1.99	1.48

* p<0.05; ** p<0.025; *** p<0.01; **** p<0.001 (all one-tailed values)

The nature of the moderating influence of napping on the relationship between items relating to the control of sleep and hypnotizability is summarized in Table 3. This tabulates mean responses of nappers and nonnappers classified by hypnotizability on the question that perhaps measures the *Control of Sleep* dimension best: "Do you fall asleep readily?" This complex table summarizes the responses on the section of the napping questionnaire completed by all subjects. Data for high- and low-hypnotizable subjects are presented in the right-hand column regardless of their napping classification. In the middle column the results are broken down into high- and low-hypnotizable nappers. In the left-hand column the high and low hypnotizable nonnappers are summarized.

It is clear from the analysis of variance that the difference between nappers and nonnappers is significant ($p<.001$). The difference between high- and low-hypnotizability levels is also significant ($p<.001$). However, the interaction between the propensity for napping and hypnotizability is quite insignificant. Indeed, the frequency distribution of hypnotizability among nappers and nonnappers is identical (X=.02; n.s.)

There are several interesting aspects of these data. It is clear that hypnotizability is an important variable related in a moderator-variable fashion to nonnapping, but not to napping. Only two of the fifteen comparisons were significant, probably a chance finding.

Differences between high hypnotizable and low hypnotizable nappers are of borderline significance. However, there are significant differences between high- and low-hypnotizable nonnappers that for the most part relate to those several questions that are concerned with the ability to control sleep in a variety of unusual circumstances.

Thus, highly hypnotizable nonnappers claim they can fall asleep easily at night and can readily fall asleep while reading a book, while studying, at a play or theater, or on a train or plane, at the movies, at a lecture, and while watching television. In fact, of the ten comparisons made concerning the conditions under which they can fall asleep readily, hypnotizable nonnappers answered "never," to only an average 2.45 of the 10, compared to 4.65 "never" responses of the unhypnotizable nonnappers ($p < .001$).

It is also of some importance to note that on all of these questions, re-gardless of their hypnotizability, nappers score significantly higher than non-nappers do. Indeed, almost all these questions have means that have the same rank order: both high- and low- hypnotizable nappers score higher than either of the nonnapper groups. Thus, our previous finding that nappers have greater voluntary control over sleep than nonnappers is not violated by these results. The new finding is that although nonnappers generally have less control over sleep than habitual nappers do, this difference is moderated by hypnotic responsivity. Those nonnappers who have the ability to experience hypnosis also has greater control over sleep processes than the unhypnotizable nonnappers.

HYPNOSIS CONTROL OF SLEEP IN CLINICAL POPULATIONS

We have replicated the relationship between hypnotizability and the control of sleep findings in several college student and patient samples (Table 4) populations, including psychiatric inpatients and chronic pain patients, and also in anorexic patients where one would expect less sleep control. We have also shown (Tables 5 and 6) that both hypnotizability and the control of sleep are related to the voluntary control of absorption (e.g. becoming involved in a book or a movie), but not involuntary absorption (e.g. being overwhelmed by a sunset). This holds for student and clinical populations. Finally, in Table 7, it is shown that both hypnotizability and the control predict treatment outcome, as measured by changes in the SCL-90 pr e and post 6 month treatment in eating disorders patients.

Table 4. Hypnotizability and the control of sleep

Hypnosis	Students	Psychiatric inpatients	Anorexia/Chronic Pain Bulimia
High	16.4	13.2	14.0
Medium	15.4	13.1	13.3
Low	14.7	10.4	7.3
N	56	45	57
p<	0.05	0.05	0.01

Table 5. Hypnotizability related to control of sleep and to controlled versus involuntary absorption: students (N= 56)

HGSHS: A	N	Control of sleep questionnaire	Controlled absorption subscale	Involuntary absorption subscale
High	23	16.4	6.6	5.7
Medium	20	15.4	6.3	5.5
Low	13	14.7	5.0	5.4
p<		0.15	0.005	n.s.

Table 6. Hypnotizability related to control of sleep and controlled absorption: psychiatric inpatients (N= 45)

SHSS: C*	N	Control of sleep questionnaire	N	Controlled absorption subscale
High	27	13.2	18	6.2
Medium	25	13.3	22	6.0
Low	12	10.4	5	3.2
p<		0.05		0.05

*Multiple r (predicting SHSS: C)= 0.45, p<0.001

Table 7. Hypnotizability, control of sleep, and therapeutic change (SCL-90): patients with anorexia/bulimia (N= 57)

SHSS: C	Control of sleep questionnaire	SCL-90 decrease
High	14.0	79.5
Medium	13.3	67.7
Low	7.3	44.6

INDIVIDUAL DIFFERENCES IN THE VOLUNTARY CONTROL OF ALTERED STATES

In summary, then, it appears that the ability to achieve deep hypnosis and the ability to fall asleep easily and virtually at will share some common mechanism.

This mechanism involves individual differ-ences in the ability to maintain control over the level of functioning or state of consciousness that seems appropriate to the person at the time. This control mechanism apparently involves the ability to change readily from one kind of psychological state or activity to another: or to maintain flexibility in changing psychological sets. The control system that allows a person to choose and initiate entry into hypnosis or into sleep, and presumably other states, may be a very general ability possessed by some people, and it may manifest itself in any of a number of circumstances. The person who possesses this ability may develop a variety of skills or coping styles to handle situations in everyday life when it is beneficial to function at different levels of consciousness. It is interesting in this regard that EEG delta sleep has been observed during the meditation periods of experienced meditators. Similarly, hypnotizable subjects were reportedly able to learn meditation techniques faster than low hypnotizable sub-jects (15). Of course, which of a number of possible and relevant states of conscious-ness that an individual can readily decide to enter will depend on other capacities that he may or may not possess. Most individuals have the capacity to sleep, although there are many who do not have the necessary control of the sleep mechanisms to achieve it as readily as, for example, the habitual napper. Individuals with a well-developed control mechanism of this kind can fall asleep almost anywhere and any time they choose. They could nap if they felt it beneficial to do so, and they would be unlikely to have serious insomnia problems. Those less fortunate individuals in whom this control mechanism is less well developed may have more difficulty in achieving sleep (within the limits set by extreme fatigue). They may need a variety of rituals and a rigidity of time schedules, or may need to depend on the timing of circadian rhythms to maximize the likelihood of obtaining needed sleep without disrupting other activities. On the other hand, the capacity to experience the hypnotic state is probably much less widespread. The fact that an individual may have a flexibility in achieving different states and changing psychological sets would be irrelevant if he did not also possess whatever other prerequisite skills are necessary to enter hypnosis, or even if he did not have the motivation to experience hypnosis. If a person can readily experience hypnosis, this suggests evidence that he potentially has well developed control mechanisms, and consequently could fall asleep easily (and nap if he chose to) whenever this was appropriate. However, the person who possesses the necessary control to nap may or may not have the prerequisite capacity to experience hypnosis. In short, it is not being suggested that sleep and hypnosis are interchangeable or functionally equivalent, but rather (providing the necessary capacities exist for the individual) that the ability to achieve either state is subsumed under the same control mechanisms: the capacity to change psychological sets, attentional states, and altered states of awareness. This hypothesis has several interesting clinical implications. For example, it suggests that most patients with insomnia are probably relatively unresponsive to hypnosis. If, however, there were some people with sleep-onset in-somnia who could experience hypnosis, then this implies that the individual has the necessary control mechanism, and therefore it should be possible to teach the person to fall asleep easily. An unpublished study by Graham provides partial support of this possibility. The responses of 20 insomniac patients with sleep-onset insomnia differed significantly on the Voluntary Control of Sleep factor from 20 control subjects ($p < .01$) for five of the six defining items). However, following short-term counseling, using a self-hypnosis relaxation procedure, six months after the treatment period the insomniac students had improved in their ability to exert voluntary control over sleep ($p < .001$) on all the criterion questions. The change was accompanied by reports of significantly improved daily sleep patterns. It appears, then, that the ability to volitionally control a variety of states of consciousness may vary widely among individuals, but for those who possess appropriate control capacity, other abilities and situational factors will deter-mine which states will be chosen by an individual. Some people may choose to nap, but only if their schedules allow it. Others may choose to enter a trancelike state, or become totally absorbed in specific tasks, or become oblivious of other surrounding activities (16). Some may be able to meditate, others, like the executive who takes a short time out with his feet on the desk, may rest; still others may choose to escape into fantasy. There are undoubtedly other altered states that can easily be substituted by the person who has the capacity to experience them. Some may have negative implications, like the phobic states that are more likely to occur in hypnotiz-able patients (17). However, which of these coping styles an individual uses may depend on a variety of factors, one of which may be the appropriate op-portunity to use the common control mechanism to learn the particular skill involved in the coping style he may prefer.

It does appear that hypnotizable subjects have the ability to fall asleep easily and in a wide variety of circumstances. While this finding does not imply any basic similarity of sleep and hypnosis, it does indicate that there may be a common underlying mechanism involved in the capacity to experience hypnosis and the ability to fall asleep easily and maintain control of basic sleep processes.

REFERENCES

1. *Evans FJ. Hypnosis And Sleep: Techniques For Exploring Cognitive Ac-tivity During Sleep. In: Hypnosis: Research Developments And Perspectives. Fromm E & Shor RE, eds. Aldine-Atherton. Chicago, Ill, 1972;43-83.*

2. *Rechtschaffen A, Kales A. A manual of standardized ter-minology, techniques and scoring system for sleep stages of human sub-jects. National Institutes of Health Publication No. 204. Washington, D.C., 1968.*

3. *Evans FJ, Gustafson LA, O connell DN, Orne MT, Shor RE. Sleep induced behavioral response. J Nerv Ment Dis 1969;148:467-476.*

4. *Evans FJ, Gustafson LA, O connell DN, Orne MT, Shor RE.Verbally induced behavioral responses during sleep. J Nerv Ment Dis 1970;150:171-187.*

5. *Braid J. Magic, Witchcraft, Animal Magnetism, Hypnotism And Elec-trobiology. 3rd Edit. Churchill. London, England, 1852.*

6. *Mesmer FA. Memmoire Sur Ia D6couverte Du Magnetisme Animal. Ge-neva, Switzerland, 1774.*

7. *Kratochvil S. Prolonged hypnosis and sleep. Am J Clin Hypn 1970;12:254-260.*

8. *Orne MT, Evans FJ. Inadvertent termination of hypnosis with hypnotized and simulating subjects. Int J Clin Exp Hypn 1966;14:61-78.*

9. *Evans FJ, Orne MT. The disappearing hypnotist: the use of simulating subjects to evaluate how subjects. Perceive Experimental Procedures. Int J Clin Exp Hypn 1971;19:277-296.*

10. *Evans FJ. The subjective characteristics of sleep efficiency. J Abnorm Psychol 1977;86:561-56.*

11. *Evans FJ, Cook MR, Cohen HD, Orne EC, Orne MT. Appetitive and replacement naps: EEG and behavior. Science 1977;197:687-689.*

12. *Shor RE, Orne EC. Harvard Group Scale of Hypnotic Susceptibility, Form A. Consulting Psychologists Press. Palo Alto, Calif, 1962.*

13. *Evans FJ. Hypnosis and Sleep: The Control of Altered States of Awareness. In: Edmonston WE, ed. Conceptual and Investigative Approaches to Hypnosis and Hypnotic Phenomena. Annals of the New York Academy of Science 1977;296:162-175.*

14. *Evans FJ. Hypnotizability: Individual differences in dissociation and the flexible control of psychological processes. In: Lynn SJ, Rhue JW, eds. Theories of Hypnosis. New York, Guilford, 1991.*

15. *Pagano RR, Rosa RM, Stivers RM, Warrenburo S. Sleep during transcendental meditation. Science 1976;191:308-310.*

16. *Tellegen A, Atkinson G. Openness to absorbing and self-altering experiences ("absorption"). A trait related to hypnotic susceptibility. J Abnormal Psychol 1974;33:268-277.*

17. *Frankel FH, Orne MT. Hypnotizability and phobic behavior. Arch Gen Psychiat 1976;33:1259-1261.*