HYPNOSIS AND POSTHYPNOTIC SUGGESTIONS

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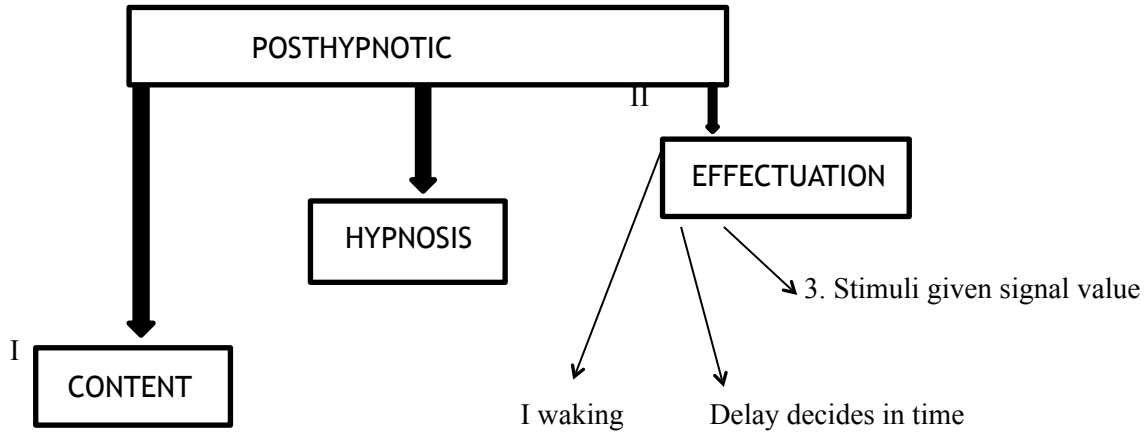
CHAPTER III. POSTHYPNOTIC SUGGESTIONS

Posthypnotic Suggestions (PHS) are, according to the prevalent definition, ”suggestions given under hypnosis but working afterwards in the waking state”. On the basis of my research on spontaneous trance, I have found that a more adequate definition would be to say: “Posthypnotic suggestions are suggestions given under hypnosis, but the effectuation of these appears after the original trance”. There are two classes of posthypnotic effects; first, changes occurring merely as a result of having been in hypnosis, and, secondly, specific effects that occur as a result of suggestions given during hypnosis. PHS is one of the outstanding phenomena of hypnosis. On the one occurs in the strength and the quality of the PH performance. Other hand, it is one of the phenomena of hypnosis most difficult to explain on theoretical grounds. Why should the suggestion be fulfilled when the Subject has returned from the hyper suggestible state to a state of normal waking consciousness? In order to explain this apparent paradox, many authorities on this subject have maintained that the waking from hypnosis is only apparent and that in fact the subject really remains in a modified hypnotic state until the PHS is finally carried out. This is not a specially plausible explanation as we now know that PHS can be carried out years after the hypnotic programming. Kroger (1963) claims that a PHS and a conditioned reflex serve a similar purpose except that the former is not established by repetitive trials and learning in the classic sense. A posthypnotic act is often carried out as the result of a single session of “learning”; it is more durable and is not as rapidly extinguished as a conditioned reflex. Kroger claims that a PHS “may last from minutes to years” and he continues “It is generally agreed, however, that on the average it may remain effective for at least two months. During this period, decrement occurs in the strength and the quality of the PH performance. Periodic reinforcement, however, tends to increase its effectiveness; repeated elicitation does not weaken it”. Subjects can have a total or partial amnesia for the PHS but some can also be quite aware of the suggestion when they carry it out. A voluntary effort to resist the suggestion often creates tension and anxiety. In this respect there is a clear resemblance to obsessive-compulsive behavior. Very few studies have been concerned with various aspects of the durability of PHS. Kellogg (1929) used a PHS to produce change in respiratory rate in response to certain page numbers while reading aloud from a book. Patten (1930) gave the PHS that the subject would depress a key in response to certain words being exposed on a revolving drum. They found that a PHS could last up to 8 months although a considerable subject variability could be detected. No sign of decay curve similar to extinction was found. They believe that intervening testing can influence and prolong the duration of PHS. Edwards (1963) gave 10 Ss PHA about slowing of reaction-time every time they heard a buzzer. He also found a considerable subject variability from one subject with a large initial response, which decayed within 1 day, to another subject showing considerable post-hypnotic effect remaining after a year. Orne (1963) gave PHS to subjects to mail a postcard daily from a stack of cards which was provided. The daily receipts fell off gradually, and much more rapidly than those from a corresponding group invited, without hypnosis, tom send in one card each day. Thus the desire to cooperate cannot be a sufficient explanation for posthypnotic compliance. Since the time of Charcot an Freud, studying rationalization in connection with PHS and up to modern literature on hypnosis one finds that PHS and posthypnotic behavior . But there are also other types of PHS, which for instance in therapy, play a more important role. I have found it relevant to divide the PHS into different types depending on their content and effectuation. (See figure on next page.) Regarding the content two main types can be distinguished:

A. Suggestions for a specific response, often a certain act.

B. Suggestions for a general state, for instance a certain mood, emotion, activation-level or attitude.



A. Specific response
B. General state
Both types of suggestions can be released in different ways.
Through:
1. Awakening
2. A delay of the effectuation decided in time
3. Stimuli, given signal value under hypnosis, for instance a certain word.
The effect of posthypnotic suggestion for an act limited in time ceases when the suggested act has been executed. Suggestions of type B, on the other hand, continue to work until the effect spontaneously ceases or until a new signal is given which abolishes the effect. Orne (1969) points out that remarkably few studies have been concerned with the mechanisms of posthypnotic suggestions although these represent unique qualities of the hypnosis. The few investigations that have been conducted were concerned with suggestions of type A. they have often been used for studies of unconscious motivation. An experiment was designed to study the working effect during a short interval after awakening, especially the first half hour after the releasing of the PHS.

A STUDY OF THE WORKI9NG DURATION OF SOME POSTHYPNOTIC SUGGESTIONS
(Uneståhl 1972 a.)

METHOD
Subjects
12 Ss, 10 females and 2 males, were selected from a large group, according to their results on SHSS-form a (maximum 12 points).

Ss	Scores on SHSS
6	12
6	11

Procedure

Measurements were made under 9 conditions:

1. Waking without any PHS.
2. PHS – good self-confidence.
3. PHS – diffidence.
4. PHS – happiness.
5. PHS – anesthesia (left forefinger).
6. PHS – amnesia for counting.
7. PHS – increased ability for counting.
8. PHS – anesthesia (right thumb).
9. PHS – drunkenness.

These 9 conditions were divided on two separate occasions (1-6 and 7-9). The order of condition 2 and 3 was rotated. In condition 5 and 8 "normal" PHS were given i.e. to feel fine in every way. Amnesia for PHS was induced in every condition. After awakening, the amnesia was controlled, after which the Ss had to guess if and what kind of PHS they thought they had been given. Subjective rating were made on Duremans scale for subjective experience analysis at an interval of 2 and 20 minutes after awakening in every condition; in the last condition, additional ratings after 1 ½ and 2 ½ hour were made. Two performance tests were also used. In the conditions 2, 3, 6 and 7 the Ss were tested on a simple counting test, the multiplication from the DBA-test. Form A was given 2 minutes and form B 20 minutes after awakening. At arrival and in conditions 2 and 3 the hand strength of the left and right hand was tested on a hand dynamometer. Before the experiment started the Ss were asked to read carefully a page with information about PHS. The same information was given to all Ss with one exception; the information about the durability of the PHS was varied as in table 3:1.

Table 3:1 Information about the durability of PHS.

SCORES ON SHSS	NO INFORMATION	INFORMATION	
		PHS last ½ hour	PHS last 8 hours
11	2	2	2
12	2	2	2
Total	4	4	4

RESULTS

Subjective ratings.

The results can be seen in the figures 3:1-3:5 are cut in order to save space.

Figure 3: Results on Ouzemon's ratingscale for subjective experience-analysis (groupmeans).
Estimations made 2 minutes after awakening.
x——x (good) selfconfidence
x--x diffidence

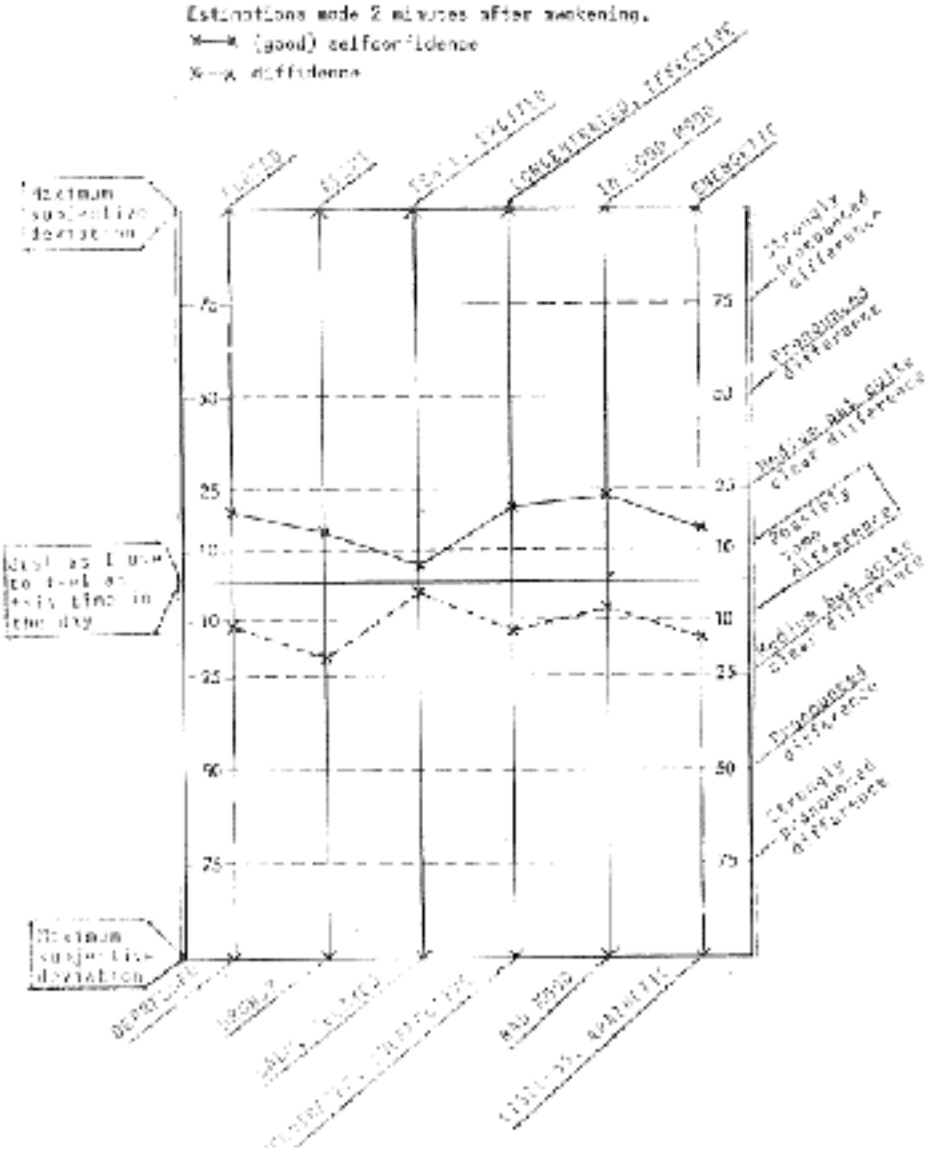
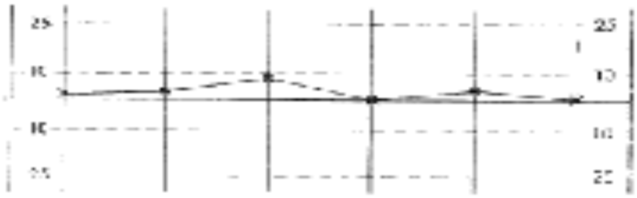
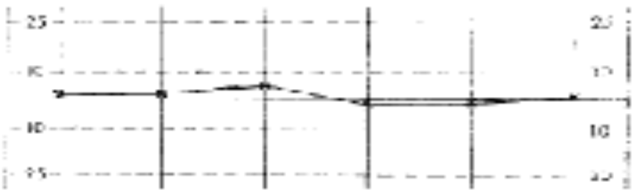


Figure 2:2 Results on [illegible] (for complete scale, see fig. 2:1) of arrival 1, 2 and condition I. Estimation mode 2 min (•——•) and 20 min (o- - -o) after [illegible].

a) Arrival day 1



b) Arrival day 2



c) Condition I: No [illegible] given

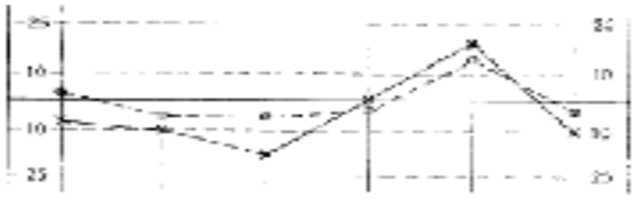
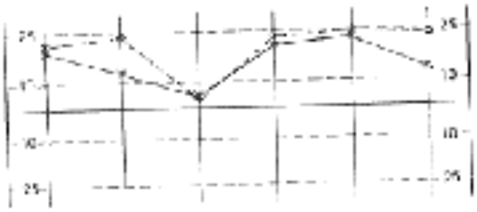
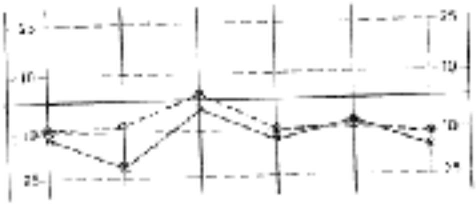


Figure 3:8 Results on Jacobson's [illegible] (for complete scale see fig. 3:1) of condition 2, 3 and 4.
Estimation made 2 min (•——•) and 20 min (Δ---Δ) after awakening.

a) Condition 2: PHS – good selfconfidence



b) Condition 3: PHS – bad selfconfidence



c) Condition 4: PHS = happiness

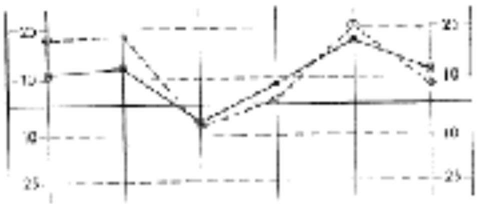
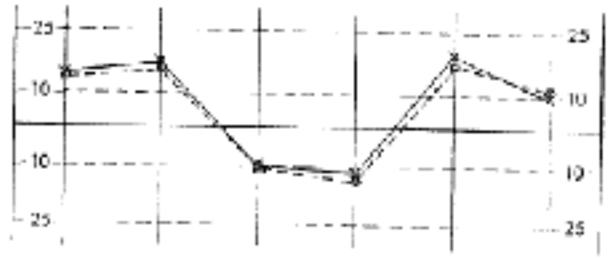
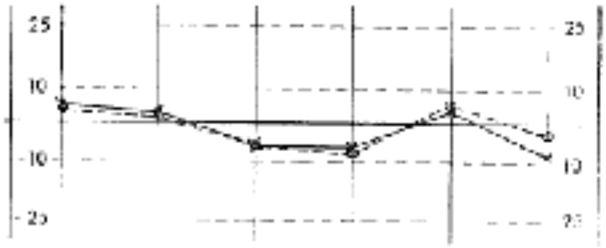


Figure 3:4 Results on Dureman's rating scale (for complete scale see fig. 3:1) of condition 5, 6 and 7. Estimation were 2 min (x——x) and 20 min (⊗- - -⊗) after awakening.

a) Condition 5: PHS - anesthesia, Normal suggestions.



b) Condition 6: PHS - amnesia for counting.



c) Condition 7: PHS - increased ability for counting.

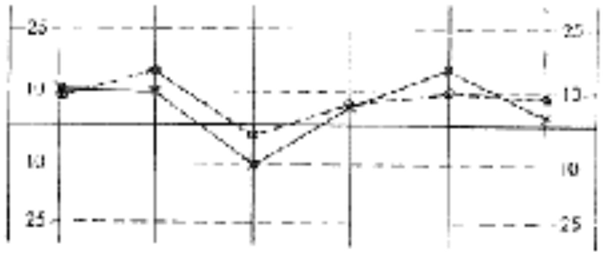
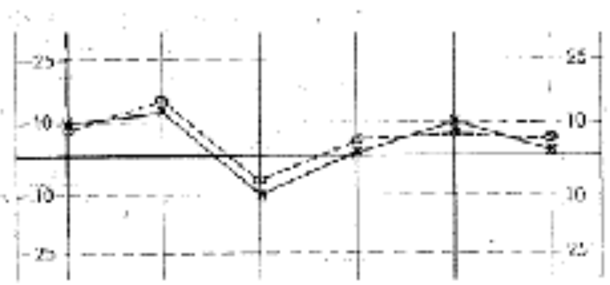
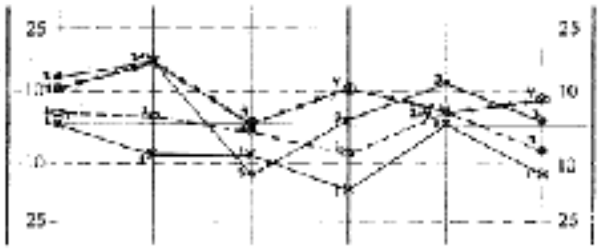


Figure 3:5 Results on Dureman's ratingscale (for complete scale, see fig. 3:) of conditions 8 and 9.
Estimations made:
2 min (×——×)
20 min (o- - -o)
90 min (•——•)
180 min (⊗·····⊗)
after awakening.

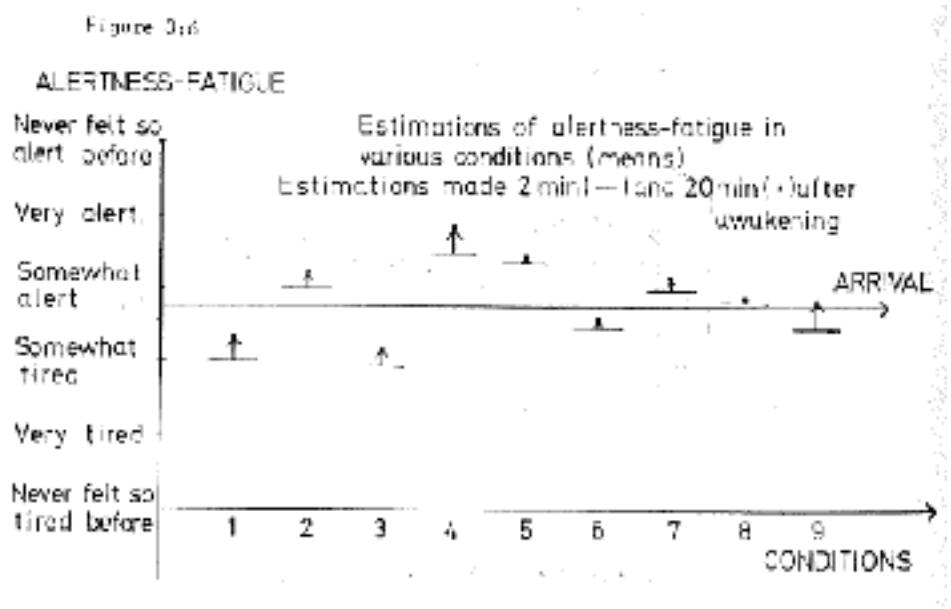
a) Condition 8: PHS - anesthesia. Normal suggestions.



b) Condition 9: PHS - drunkenness.



The subjective ratings manifest themselves clearly in most conditions 2 minutes after awakening. At the second rating period, 18 minutes later, only small changes have occurred. The ratings from the different Ss show great consistency with each other. Another rating was made in each condition, namely the level of alertness-fatigue. The results of these ratings can be seen in figure 3:6.



Condition 4 is the only condition with values, significantly deviating from the estimations made at arrival. A trend can be seen towards more alertness 20 minutes after awakening compared with 2 minutes after, independent of the level at awakening, i.e. the same trend as before; decreasing "negative" and increasing "positive" values.

Performance test.

Hand dynamometer

Before the experiment started, the Ss showed their maximal strength in their left and right hands on a hand dynamometer. They tried twice3 with each hand and got immediate feedback i.e. the results were revealed to them. In conditions 2 and 3 they repeated the test but this time without feedback. After each trial they had to estimate the results. The instruction was all the time the same: "Press as hard as you can". The results can be seen in table 3:1 and figure 3:7. (The values were taken directly from the scale of the hand dynamometer and were taken directly from the scale of the hand dynamometer and were not translated to kp.)

Table 3:1 Result from hand dynamometer (relative values, N Ss).

	ARRIVAL		DIFFIDENCE		GOOD SELFCONFIDENCE	
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
Objective scores	22,0 21,8	21,9 22,0	21,2 21,2	21,7 21,9	22,9 23,2	23,1 22,8
	21,9		21,5		22,6	
Subjective ratings			18,4 19,0	20,4 20,6	24,0 22,6	23,7 23,6
			19,3		23,5	

Figure 3:7 Results from handdynamometer. objective scores and subjective ratings (Means over Ss and trials)

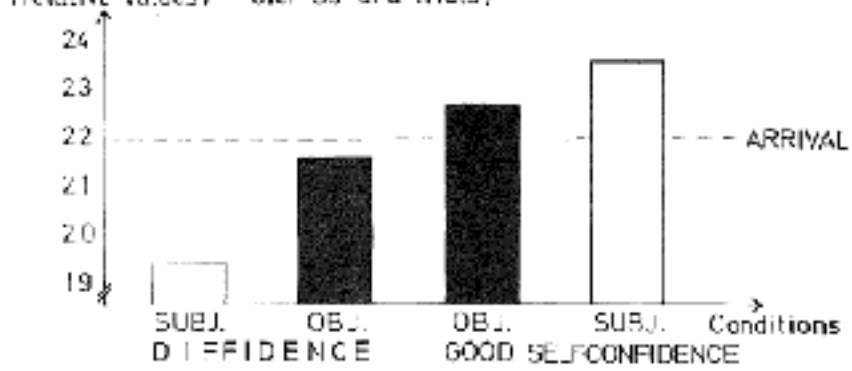
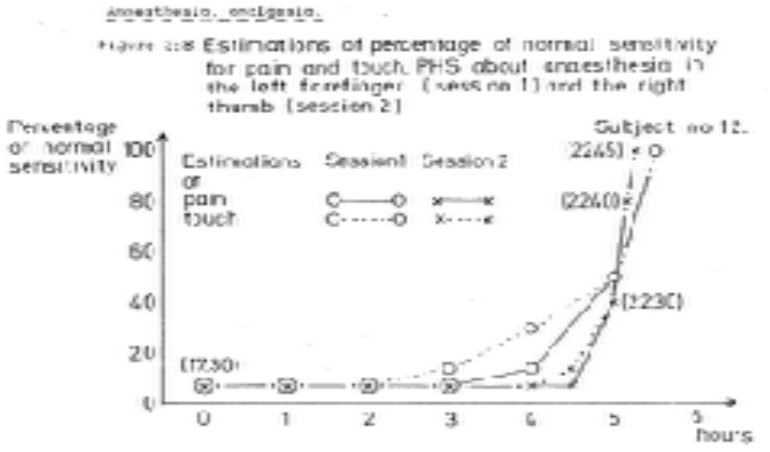


Table 3:2 Results from hand dynamometer. Testing of significance for differences between the conditions (sign-test, p 0,05).

	Subjective ratings		Objective scores	
	Left hand	Right hand	Left hand	Right hand
Diffidence - good self-confidence	Sign. p-0,002	Sign. p-0,004	Sign. p-0,32	No sign. p-0,055

Thus, even if PHS seems to influence the Ss ability to make use of their hand strength, the suggestions seem to influence still more the subjects estimations of their results.



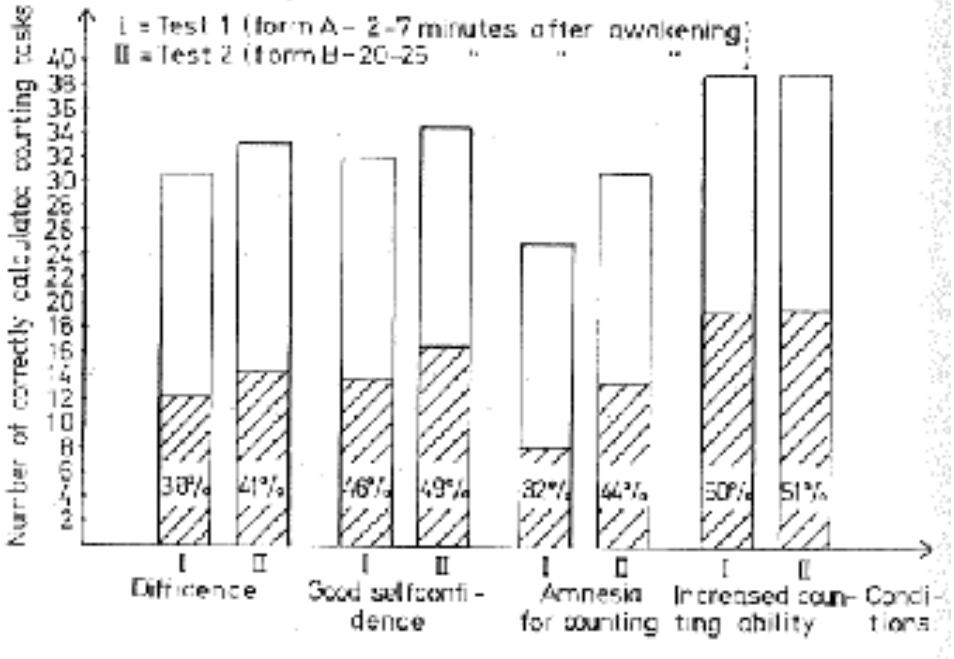
Conditions 5 and 8 contained PHS about anesthesia inleft forefinger and right thumb. The test frequency, every 2nd, every 5th or every 10th minute was varied between the Ss and the two occasions. The Ss rated both loss of pain sensation an kinesthetic sensations. The result showed that all Ss except one had regained quite normal sensation within 22 minutes (from 5 to 22 minutes). The exception was subject no 12, where PHS continued to work up to 5 hours (figure 3:8). No difference could be seen according to test frequency, the two occasions, left forefinger and right thumb or the prior information regarding PHS.

Counting

The multiplication test from the DBA-battery was used under the conditions 2, 3, 6, and 7, i.e. after variations in self-confidence and counting ability. The two parallel tests were used, form A 2-7 minutes and form B 20-25 minutes after awakening. The test time was 3 minutes and the number of correctly calculated tasks were the scores. The Ss maked their positions in the test after each minute. The results can be seen in figure 3:9. After awakening with good self-confidence there is a trend for higher scores compared with diffidence. However this difference is not significant but twenty minutes later at test II the difference is significant ($p = 0.035$). Between the first and the second testing there is a change in the same direction for both conditions and with the conditions taken together the change is significant ($p = 0,015$). Between the two conditions where the counting ability was affected by the PHS the difference was significant from the beginning (test 1 – $p = 0,008$, test 2 – $p = 0,016$). Only one subject had a complete blocking for counting at both test sessions while the other Ss had larger or smaller difficulties to count. The effect of this negative suggestion was, however, significant less at test session II compared with session I, while the performance after the positive suggestion remained at the same high level at both test sessions. The relative number of counting tasks after one minute compared with the final results (the percentage figures in the figure 3:9) manifest an interesting tendency. The influence of the PHS, either positive or negative, seems to be largest during the first minute.

Figure 3:9

Number of correctly calculated counting tasks during 4 conditions – after 1 min (1st line) in percentages of the total numbers (3 min). (Means)



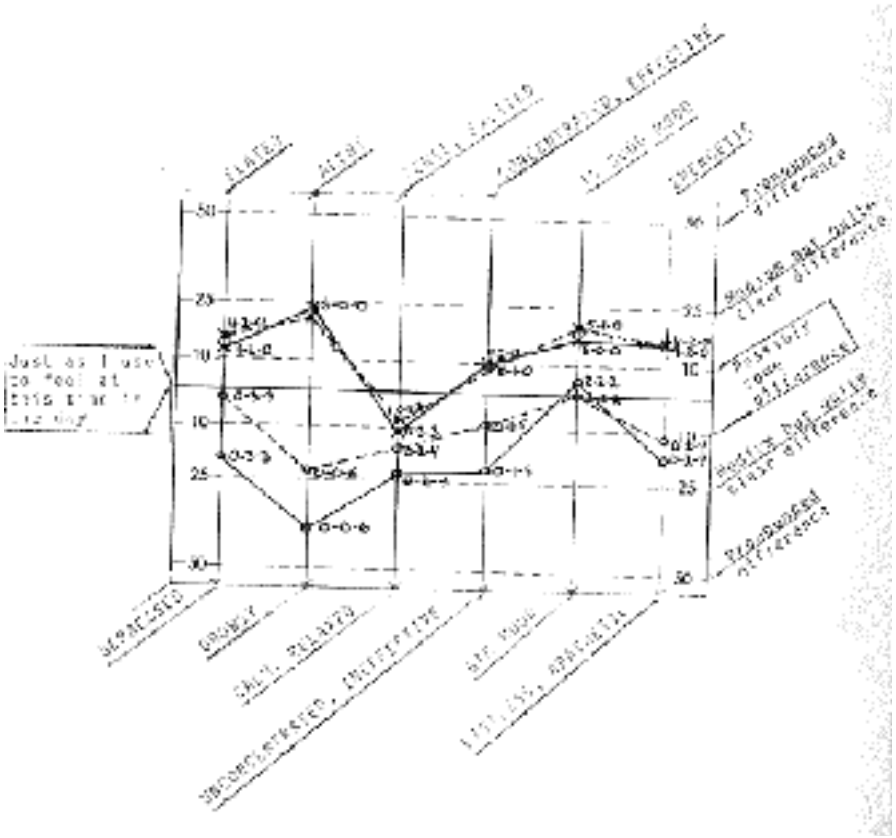
DISCUSSION

10 Ss had complete amnesia and 2 Ss had partial amnesia for the given PHS. Sometimes they still managed to guess the right PHS according to them out from their feelings after awakening. The various PHS do not correspond directly to the variables in the subjective rating scale. They cover instead various dimensions in the induced mental state. The subjective ratings manifest themselves clearly, thus indication that the Ss investigate and describe their current state and not the specific suggestion which has elicited the state. One interesting thing can be seen by analyzing the subjective ratings. The Ss seem to react somewhat differently depending on the content of PHS. Positive suggestions have a tendency to increase their strength between 2 and 20 minutes, while the ratings after negative suggestions show a tendency of returning to normal level faster. The ratings of alertness – fatigue have the same trends (fig. 3:6). After a positive PHS the subject feels more alert than normal and more tired than normal after a negative PHS. This concerns the ratings of 2 minutes after awakening. All the ratings of 20 minutes after awakening show that the Ss feel more alert than 2 minutes after. This holds true also for the objective scores of counting tasks where there is a significant increase in calculated tasks from the first to the second test for the conditions “diffidence” and “good self-confidence” and for the “amnesia” condition. In the study about post hypnotically induced fatigue (Uneståhl, 1968 b, chapter VIII), the same ratings scale as in figure 3:6 were used 0,15,30,45, and 60 minutes after awakening with PHS about alertness or fatigue.

Figure 3:10 Results on Dureman´s rating scale (for complete scale see fig. 3:1) after PHS about alertness (xx) and fatigue (oo). Estimations made immediately (-) and 1 hour (---) after awakening (Means)

The figures after the rating means (x-y-z)
X=Number of ratings above the middle line

Y= Number of ratings on the middle line
Z= Number of ratings below the middle line



If we look at the subject´s feelings the first hour after awakening (figure 3:10) we can see the same tendency s mentioned before, the "negative" effects are considerably reduced. The positive effects are not increasing any more but remain one hour after awakening, at the same level as just before awakening. The differences between the two conditions in estimated feelings are significant for four of the six rated variables. In spite of the decrease of the "negative" feelings the differences are still significant one hour later. The instructions in condition 6 concerned a total blocking of the counting ability, but only one subject showed a total amnesia for counting. The other Ss reacted only with a somewhat decreased counting ability. The subject with the total blocking was asked to wait for a spontaneous return of the counting ability. After two weeks, still having a similar considerable blocking, she did not want to continue. With a new hypnosis induction the earlier induced suggestion were terminated and the counting ability was thus immediately regained. As this person spoke fluent german after spending three years in Germany, a similar study was made later with blocking the german language. Even here the blocking was total. In this case the ability returned spontaneously after a few days. She dreamed that she was in Germany and said something in german. After awakening the blocking was gone. More about blocking will be taken up in the next chapter.
The increasing values of the "positive" PHS may be due to a decay of the spontaneous posthypnotic effects. many Ss feel somewhat disorientated after awakening and have for a short while some feelings of trance-quality. Spontaneous posthypnotic effects seem to appear independent of it and what kind of PHS have been induces. These posthypnotic effects may have an inhibitory effect on the induces PHS. This explanation is, however, not valid for "negative" PHS, which change in the opposite direction. This gradually deteriorating from the very beginning after awakening may be due to an unconscious resistance which counterworks the negative PHS even when the Ss are not aware of the PHS. This resistance might also explain one of the findings in the experiment with car driving in a simulator (chapter VIII), where a trend was found for prolonged awakening time after negative PHS compared with positive PHS.

PHS, RELEASED BY SIGNALS

All PHS that have been previously mentioned have been of type B 1 i.e. general states released by awakening. Another way of releasing PHS is using various stimuli, given signal value under hypnosis. Some data will be mentioned from studies using such PHS. In one study (Uneståhl et al., 1971 f) the posthypnotic behavior "walk over the floor and pick up that book on the table" was released by the signal word "Sinduli". In two other conditions "left arm rigidity" was released by the signal word "Barvani" and fatigue" by the signal word "Bishnat". The posthypnotic effects were allowed to fade spontaneously. The first PHS was of type A 3, which disappears as soon as the behavior is executed. Five subjects manifested the behavior "left arm rigidity" which lasted between 3 and 17 minutes. Four subjects manifested "fatigue" with a duration of 5 to 25 minutes. In another study (Uneståhl, 1969 b) color-blindness was induced with a signal word and abolished with another signal word. The subject with the strongest response was chosen as a case study in order to investigate the durability of PHS. The PHS was released by a signal word on different occasions.

Table 3:2 The durability or working effect for colour-blindness (hours).

a) 4 Ss, 1 occasion b) 1 subject, 7 occasions

Ss	Total time	Occasion	1	2	3	4	5	6
1	4	waking	4	2	5,5	2 3/4	7	7 1/2
2	9,5	sleeping	0	0	9	0	6 1/2	8
5	1/3	total	4	2	14,5	2 3/4	13 1/2	15 1/2
7	1/3(green) 5 (red)							

On the 7th occasion the CS was working 4 days, after which the PHS was abolished. The results indicate a big inter- and intra-individual variability with a weak tendency of increasing durability with the repeating of the signal (only 1 subject). The two colours allways returned at the same time with the exception of one occasion. Sleep does not seem to abolish the effect.

COMMENTS

In some studies (Uneståhl, 1968 b, c) the duration of the PHS is determined during programming under hypnosis. In other experiments (Uneståhl, 1969b, 1970 a, 1971 a, 1974 c) the Ss retrieved normality by an antisignal. The studies, reported in this chapter, are those where nothing has been said about the durability of PHS during hypnosis and where the possibility has been given for the PHS to fade away spontaneously. Big differences can be seen in working duration of the PHS, from a few minutes to some days. Some factors related to the variance seem to be:

Individual factors: Susceptibility to hypnosis cannot be the only individual factor of importance since the subjects in some of the studies have had the same hypnotizability score (SHSS).

Type of PHS: As mentioned before the PHS of A-type cease when the suggested behavior is executed, so working duration here depends on the behavior Among the PHS of B-type a variation can also be seen. No study has been done to investigate the relation between types of PHS and their durability, but from these studies, reported, blocking type of PHS seems to last longer than many others.

Positive-negative PHS: Between the two rating occasions (2 and 20 minutes) in the first study, positive PHS seem to increase and negative PHS decrease in strength and quality. What about this information in textbooks on hypnosis that PHS can last for months or for years? I am inclined to disagree with this statement since it is based on the fact that no distinction is made between on one hand the durability of PHS and on the other hand the ability of the post-hypnotic signal to elicit the programmed effect. Therefore it is actually not the PHS which lasts for years, but rather the signal which can keep its signal value for years so that every time it appears, the suggested effect will be elicited again.

This chapter has shown that:

1. It is meaningful to divide the PHS in two types regarding the content (A-B) and three types regarding their effectuation (1, 2, 3).
2. The PHS of A-type cease when the suggested behavior is completed, thus working duration of PHS depends on the behavior.
3. The durability or working duration of PHS of B-type can also be controlled by:
   a) Suggesting the duration under hypnosis.
   b) A signal which is programmed so that the signal always terminates the suggested effect (antisignal)
4. If the working duration is not steered, the effect of PHS will spontaneously fade away after some minutes or hours or in exceptional cases after a few days.
5. The variation of the working duration seems to be related to:
   a) Individual factors, where susceptibility to hypnosis does not seem to be the only factor of importance.
   b) Type of PHS, where in these studies blocking type of PHS seems to last longer than many others.
   c) Positive-negative PHS, where for instance positive PHS increase and negative PHS decrease in strength during the first 20 minutes after releasing the effect. Even a trend for a prolonged awakening after negative PHS compared with positive could be seen.
6. No detectable effect of durability of PHS could be observed in these studies of such factors as test frequency and variations in expectancy, however for a conclusive statement further investigation is required.
7. Releasing of induced PHS of type B 1, manifests obvious effects above all on the subjective side but also on the behavioral side.
8. The effectuation of for instance diffidence and good self-confidence manifests itself on the individual´s subjective estimation of his own performance.
9. The subjective ratings in these studies describe different aspects of the induced state and not only the specific PHS involved.
10. Statements in textbooks on hypnosis that PHS can last for years arise from the confusion between the durability of PHS and the signal´s ability to elicit the programmed effect. The PHS fade away rather quickly but the signal can retain its signal value and release the PHS even years after the original programming.

CHAPTER IV. POSTHYPNOTIC TRANCE

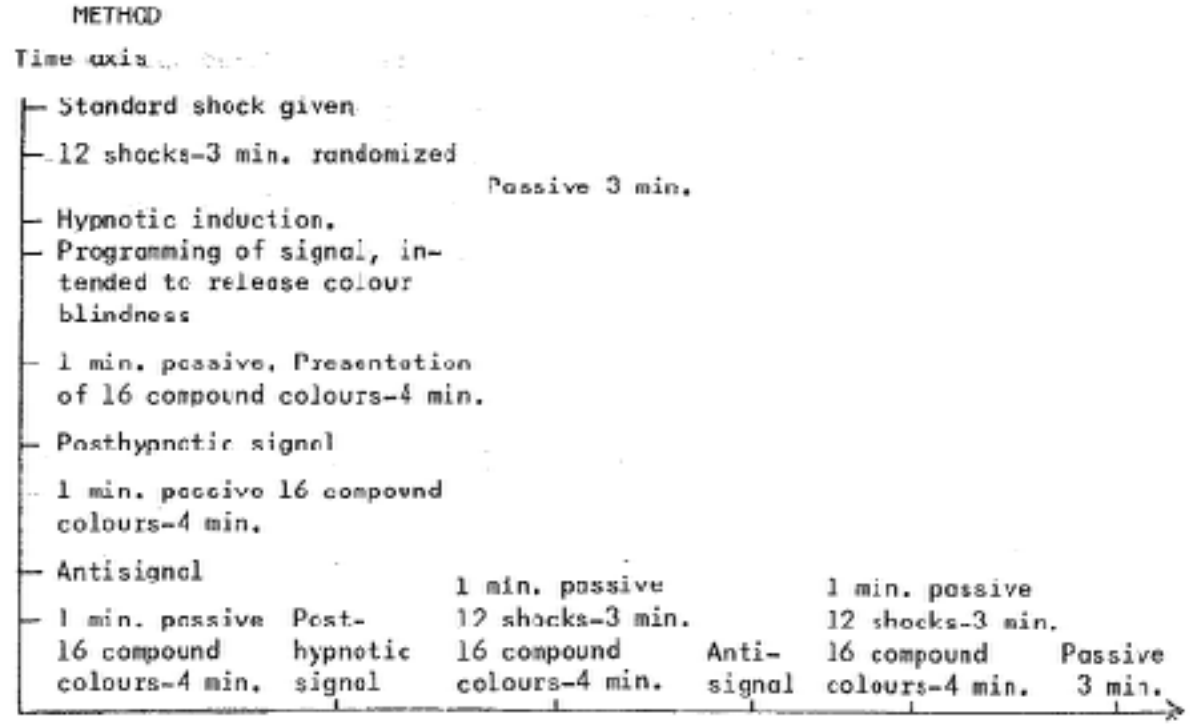
The effectuation of a posthypnotic suggestion often seems to be accompanied by a posthypnotic or a spontaneous trance (ST), i.e. a trance which has earlier mainly been described by M.H. Erickson (1967). His findings can be summarized as follows:

1. Although there has been frequent recognition that posthypnotic suggestions lead to the development of a peculiar mental state in the hypnotic subject, there has been no direct study of that special mental condition. Neither has there been provision or allowance made for its existence and its possible significant influences upon results obtained from posthypnotic suggestions.
2. The specific manifestations which occur rapidly in direct relation to the giving of the specified cue for the post hypnotic act often have the following sequence: A slight pause in the subject`s immediate activity, a facial expression of distraction and detachment, a peculiar glassiness of the eyes with a dilatation of the pupils and a failure to focus, a condition of catalepsy, a fixity and narrowing of attention, an intentness of purpose, a marked loss of contact with the general environment and an unresponsiveness to any external stimulus.

3. The spontaneous post-hypnotic trance may be single or multiple, brief or prolonged. In general, it appears for only a moment or two at the initiation of the post-hypnotic performance and hence it is easily overlooked.
4. Demonstrations and testing of the spontaneous trance are usually best accomplished at the moment of the initiation of the post-hypnotic performance by interference either with the subject or with the suggested act. Properly given, such interference ordinarily leads to an immediate arrest in the subject´s behavior and a prolongation of the spontaneous trance.
5. The lapse of an indefinite period of time between the giving of a post-hypnotic suggestion and the opportunity for its execution does not affect the development of a spontaneous post-hypnotic trance as an integral of the posthypnotic performance.
6. Apparent exceptions to the development of the spontaneous trance as an integral part of the post-hypnotic performances are found to derive from significant changes in the intended post-hypnotic situation which alter or transform it into one of another character.
7. The spontaneous trance is a phenomenon of sequence, since it constitutes a revivification of the hypnotic elements of the trance situation in which the specific post-hypnotic suggestion was given. Hence, its development is a criterion of the validity of the previous trance.
8. The spontaneous trance may be used advantageously as a special experimental ant therapeutic technique, since it obviates various difficulties inherent in the usual method of trance induction.
9. The post-hypnotic performance and its associated spontaneous trance constitute dissociation phenomena because they break into the ordinary stream of conscious activity as interpellations and since they do not become integrated with the ordinary course of conscious activity.

Except for the observations of Milton H. Erickson, the studies on ST have been made exclusively here in Uppsala. Göran Berger (1972) constructed a one-dimensional scale on the basis of information analysis theory. As a measure of suggestibility the concept of transmission was used. The degree of transmission was based on the S´s subjective estimation of a tone stimulus which was presented with varying degrees of veridicality. By using multivariate information analysis transmission values for hypnosis as well as spontaneous trance can be obtained. The maximum value for the scale was 1.59 Compared with the Stanford Hypnotic Scale of Susceptibility, form A, SHSS-scores on 0-2 gave a mean transmission value (M_T) on 0.03; SHSS-scores between 5 and 10 gave a M_T on 0.16 and a SHSS-score on 12 gave a M_T on 0.82. The scale has an increasing discriminatory ability with higher SHSS-scores. Ss with the maximum SHSS-score of 12 can be clearly differentiated by the transmission scale. In one study (Gessbo & Möcker, 1969) the transmission values were compared in hypnosis and spontaneous trance. Only the Ss with a deeper original hypnotic trance showed an evidence of a spontaneous trance. The results gave some support to the theory that the spontaneous trance should be a revivification of the original hypnotic trance. In the first experiments studying ST (Uneståhl et al., 1968 e, Uneståhl, 1969 a, b), color blindness was chosen as the PHS, i.e. blocking of the red and green colors.

<u>POSTHYPNOTICALLY INDUCED COLOUR BLINDNESS (Uneståhl, 1969 b).</u>



7 susceptible Ss were picked out for the experiment. Two different stimuli words were given signal values under hypnosis, one signal inducing the color blindness and one anti-signal abolishing the influence of the first signal and restoring the normal color vision. In the main experiment the signal and the anti-signal were given twice3. In the pre-experiments an and follow up, on the other hand, the suggestion effects were to cease spontaneously before the signal was given again. This was also done to get an idea of the working duration of this type of suggestion and possible changes by repeated effectuation.

Independent variables were:

1. State of consciousness
   a) Awake (normal)
   b) Hypnosis
   c) Post hypnotically awake
   d) Post hypnosis (posthypnotic suggestion working)

2. Stimuli
   a) presentation of colors
   b) administration of electrical shock.

Dependent variables were:

1. Autonomy registration
   a) Respiration
   b) Pulse
   c) DC – PGR SRL
   d) AC – PGR SRR

2. Estimations of experienced color
3. Time of latency for color-estimations
4. Estimations of experienced electrical shock.

SOME RESULTS DISCUSSED

During the first pre-experiments it was shown that the Ss had amnesia for the signal word and sometime after the signal was given, but the amnesia did not last for all the period during which the posthypnotic suggestion was working. During the fourth pre-experiment it was found by coincidence that the effectuation of the posthypnotic suggestion was accompanied by total anesthesia of some minutes duration which then totally disappeared. The time of anesthesia was found to coincide completely with the time of amnesia and extended over a period during which the Ss also showed several of the earlier mentioned external signs of spontaneous trance. The hypothesis that anesthesia is a more general indicator of spontaneous trance received strong support in the main experiment where anesthesia appeared with all seven Ss in connection with the administration of electrical shock during the posthypnotic period and the others felt the shock weaker than at other times. Thus, anesthesia seems to be a good and objective criteria of the spontaneous trance that also gives a possibility to decide the duration of the spontaneous trance more exactly.

ST as reactivation of original trance

Milton Erickson has shown that if a PHS together with a cue is given, when the Ss are discussing a certain topic, the cue will later release the PHS. If the subject is arrested when he begins to carry out the PHS, he will show signs of a trance state. If one the comments: “I forgot what you just said” the S will continue with the previous discussion which he had started when the PHS was given, for instance one week earlier. Milton Erickson means that such observations support the view that the Ss are back in the original trance, carrying out the activity when the PHS was given.

To test the hypothesis that the ST is a reactivation of the elements in the original trance, some autonomic measurements were made during hypnosis and programming of the PHS and during the periods after the posthypnotic signal and anti-signal, two of each were given, and one passive minute after each signal gave the values.

Table IV:1 Parallel and non-parallel changes between hypnosis and posthypnotic periods.

Subjects	Respiration	Pulse	BR	SF	
1	x(-)	x(-)	x(-)	x(+)	4
2	x(-)	x(-)	0	x(+)	3
3	x(-)	0	x(-)	0	2
4	0	x(+)	0	0	1
5	x(-)	x(+)	x(-)	x(-)	4
6	x(-)	0	0	0	1
7	x(-)	0	x(-)	x(+)	3
Total	6	4	4	4	18

X= Parallellity (-) decreasing values during both
(+) decreasing values during both

0= No parallellity

Criterium on parallellity: change with at least 10% more than the passive minutes in the other conditions. The Ss showed parallel changes between hypnosis and the posthypnotic periods on 18 of the 28 occasions with respiration having the highest parallellity (6 of7). The results must however be interpreted with some reservation. One minute is a short period to measure changes in autonomic variables but can still be too long here as the ST is often of a shorter duration than 1 minute. Another difficulty is the lack of any typical autonomic pattern during hypnosis (see chapter 1). A smaller difference between hypnosis and wakefulness in autonomic measures makes it more difficult to interpret posthypnotic measure values as parallel to hypnosis. Thus, a new experiment was designed (Uneståhl et al, 1971 f)

ATYPICAL BEHAVIOR DURING HYPNOSIS RELATED TO SUBJECT EXPECTATIONS

PHS were planned to be given during hypnosis at a time when the Ss were manifesting a typical behavior for hypnosis. Before the hypnotic induction the subject was given an instruction implying that a certain behavior is always manifested in the hypnotic state. The false expectation, thus created, implied that the right arm always raises in hypnosis. The subject was then hypnotized and the appearance of the atypical hypnotic behavior was checked. Next the posthypnotic state was induced. According to Erickson´s reactivation theory arm raising would be expected also in the posthypnotic trance. If the atypical behavior would occur together with the other indicators of posthypnotic trance (amnesia and anesthesia) this behavior may be used as another indicator of posthypnotic trance. Moreover it would support the proposition that posthypnotic trance is a reactivation of the original hypnotic trance. In addition, time correlations between posthypnotic trance and posthypnotic behavior and their intraindividual patterns were studied. From Uneståhl´s paradigm (p.) concerning posthypnotic suggestions the following problems can be derived: Duration of the posthypnotic trance in relation to the induced behavior or the induced general state. Is the posthypnotic effect released already during the posthypnotic trance or not until the trance has disappeared? The duration of the posthypnotic behavior in relation to the posthypnotic trance. Other problems studied were: Duration of the posthypnotic suggestions, duration of the indicators of the posthypnotic trance, the correlation between the duration of the posthypnotic trance and the duration of posthypnotic suggestions.

Experiment I

A questionnaire concerning hypnotic susceptibility was administered to 94 persons. Of these, 9 were selected as subjects. Condition A was perceived by a verbal instruction implying that it is typical for a hypnotized person to feel that his right arm will raise. In condition A the subject´s hypnotic susceptibility was measured by a shortened version of the SHSS A. subjects who raised their right arm or scored on the amnesia item or passed both criteria were allowed to proceed to the following three conditions. Conditions B-D consisted of a hypnotic induction and a suggestion implying a posthypnotic signal-released behavior or state. In condition B the posthypnotic behavior “walk over the floor and pick up the book on the table” was released by the signal word “Sinduli”. In condition C “left arm rigidity” was released by the signal word “Barvani”, and in condition D the posthypnotic state “fatigue” by the signal word “Bishnat”. The posthypnotic effects were allowed to fade spontaneously. The posthypnotic trance was studied by the indicator “amnesia”. None of the subjects raised their right arm during hypnosis. Only one subject scored on the amnesia item and was thus allowed to proceed to conditions B-D. An analysis of the results from experiment I showed that the arm-raising response probably would be facilitated by tacti e suggestions during hypnosis in addition to the verbal instruction.

Experiment II

Methodologically experiment II differed from experiment I in two respects: during the induction in condition A the subject was given tactile suggestions i.e. the experimenter lifted the subject´s right arm twice. Also when testing for post-hypnotic trance another indicator, anesthesia was used. The questionnaire was administered to another 56 persons and 15 were selected as subjects 5 were allowed to proceed to conditions B-D since they raised their arm or raised the arms and passed the amnesia item, and one subject proceeded after having passed the amnesia item only. That 5 subjects out of 15 raised their right arm during the hypnotic inductions slightly supports the hypothesis that the arm lifting response is facilitated if tactile suggestions during hypnosis are added to the verbal instruction. One subject raised her arm also during the posthypnotic trance. Thus, an atypical behavior appearing during hypnosis may reappear during posthypnotic trance, an observation giving some small support to Erickson´s reactivation theory. The arm lifting response during posthypnotic trance lasted during the same interval as the other indicators of posthypnotic trance (amnesia and anesthesia). The arm lifting response then worked as an indicator of posthypnotic trance. Thus the studies mentioned have given some, but not very strong and clear, support to Erickson´s reactivation theory. Furthermore, our measurable criteria of ST have been spontaneous amnesia and anesthesia. These phenomena can occur spontaneously also during common hypnosis, but in rather few Ss. Especially is spontaneous anesthesia a very rare phenomenon, while we in our studies have measured ST by anesthesia in many Ss. There are also other apparent differences between common hypnosis and ST. Even if highly susceptible Ss can be taught to enter hypnosis very quickly by a signal. Hilgard (1973) has shown that it takes some time to establish such a depth, where for instance suggestions of anesthesia will be effective. ST on the other hand seems to appear immediately and occasionally last during a short time, probably during still shorter periods than the few seconds we needed to measure it. Milton Erickson´s observations were also made in a different way, he prolonged the ST by arresting the behavior of the S and created perhaps in this way a trance with somewhat different characteristics, while our investigations have been on ST as such. On the basis of the evidence from our studies, I am apt to disagree with M. Erickson´s idea of ST as sole reactivation of the specific element of the original trance.

THE DURATION OF ST

A STUDY OF SIGNAL-RELEASED POST-HYPNOTIC SUGGESTION

As being one of the first studies made on ST (Uneståhl, 1970 a) I tried to investigate some preliminary answers to the following questions:

1. What is the duration of the ST, measured as the period of spontaneous anesthesia?
2. Is the anti-signal (ending the effect of the suggestion) a post-hypnotic suggestion of the same kind as the signal?
3. Are there any differences in the duration of the trance between signal- and anti-signal triggered suggestions?
4. Will there be any differences in the duration of the trance with the repeating of the signal-words?
5. Will the post-hypnotic suggestion start to work in or after period 1 (the spontaneous trance)?
6. Will there be any difference in GSR, if the electrics shocks are given in or outside the spontaneous trance?
7. Will there be any visual and/or auditive blocking of the signal-words, and if so, will it generalize also for words similar to the signal words?

6 Ss with SHSS-scores between 9 and 12 took part. Electric shocks were given rather often during the experiments and anesthesia was taken as an indicator of spontaneous trance. The posthypnotic suggestions concerned the left leg which should raise after the signal and sink down to normal position

after the anti-signal. Both signals were presented twice each. After removing the GSR-electrodes the Ss were given the idea that the investigation was finished, whereupon the signal was again suddenly presented. Blocking of the signal-words was checked by urging the Ss to read, write and repeat words and sentences containing sound combinations of varying similarity to the signal and anti-signal.

RESULTS

Only the results illustrating the duration of ST are presented in this chapter. Table IV:2 Number of shocks with no reaction after the signal

Ss	1	2	3	4	5	6	7	
SHSS-score	9	12	11	11	9	9	11	Total
Signal 1	5	4	0	0	0	5	0	14
2	9	6	0	0	0	0	1	16
3	3	5	0	1	0	0	1	10
4	4	14	0	0	0	0	1	19
5	2	14	0	1	0	1	1	19
Total	23	43	0	2	0	6	4	78

Table IV:3 Number of shocks with no reaction after the anti-signal.

SS	1	2	3	4	5	6	7	
SHSS-score	9	12	11	11	9	9	11	Total
Anti-signal 1	2	4	0	0	0	0	1	7
2	1	2	0	2	0	0	1	6
3	2	3	0	1	0	0	1	7
4	2	4	0	0	0	0	1	7
5	3	4	0	1	0	0	0	8
Total	10	17	0	4	0	0	4	35

Table IV:4 The duration of the spontaneous trance (time in sec. from the signal/anti-signal to the first reaction to the shock. Mean of the 5 presentations).

Ss	1	2	3	4	5	6	7	Total
After signal	33	71	0	2	0	9	4	119
After anti-signal	11	21	0	4	0	0	4	40

Out of the 7 Ss five manifested a measurable ST, and of these five four manifested ST both after the signal and the anti-signal. A big individual variability in ST duration from 2 to 33 seconds can be seen. No relation can be found between the sign and duration of ST and the different depth of hypnosis represented in the study. The S with the highest ST-duration had obviously the highest SHSS-score (12), but the second S has only 9 SHSS-score. The anesthesia is generally concentrated to the period followed immediately by signal and anti-signal, but can exceptionally be scattered over the whole posthypnotic period. The anti-signal seems to be a posthypnotic signal of essentially the same character as the signal but a tendency for a longer duration of ST after the signal compared with the anti-signal was found, No systematic change in the duration of ST with repeating of the signal and anti-signal was found.

POST-HYPNOTICALLY INDUCED ANAESTHESIA AND HYPERAESTHESIA

The next study (Uneståhl et al., 1971 c) investigation the duration of ST had also the purpose mainly to study the effects of signal-triggered posthypnotic suggestions upon physiological variables and subjective ratings of painful stimuli, and further the efficiency and duration of the two posthypnotic suggestions. Main hypothesis: (A) Physiological (GSR) as well as subjective responses to pain tend to move in the direction of increased responses to pain tend to move in the direction of increased response when hyper anesthesia is suggested and in the opposite direction after suggestions for anesthesia. (B) Both signals will be followed by a period of anesthesia of varying duration for different Ss.

METHOD

A questionnaire was administered to 250 Ss measuring interest in hypnosis, motivation to be hypnotized and self-prediction of the S´s hypnotic susceptibility. The 40 Ss with the highest total score were then tested with the SHSS (form A), since a positive correlation between these variables and suggestibility had been found in an earlier study. These 40 Ss also estimated their susceptibility after hypnosis. 11 Ss with a SHSS-score of 11 or 12 were selected for the experiment. Hypnosis and all instructions were given through a tape recorder. Before hypnosis was induced again, the Ss were given electric shocks in the right hand and instructed to estimate the strength according to a predetermined scale with a standard = 10. During the whole experiment the shocks were always given with identical intensity, the Ss being unaware of this. Every series of shocks lasted for 7 minutes and was built up by 15 shocks separated by random intervals. Under hypnosis two different words were given posthypnotic signal value. One word (S_1) aimed to remove all sensation from the right hand when given post hypnotically and the other word (S_2) aimed to increase the sensitivity of the same hand. The duration of the suggestions was not specified and suggestions for amnesia were given under hypnosis.

After the Ss were awakened from hypnosis the schedule of shocks was run and a record kept over GSR and the subjective estimations of shock strength. The S_1 was given by tape-recorder and the signal was immediately followed by 5 shocks during the first 45 seconds for checking the spontaneous trance. The duration of the spontaneous trance was investigated by studying the duration of the aesthetical period following the signal-words. After the 45 seconds the ordinary series of shocks was administered. S_2 followed and the procedure above was repeated. After this the two signals were again presented in the same manner followed by the shocks. During the shock-ratings the Ss listened to soft music and after the experiment an interview was made to find out if amnesia for the signals and shocks had occurred. The 8 Ss who showed spontaneous trance and amnesia came back 24 hours later and the shocks were again administered first once without any preparation then twice for each signal. The procedure was repeated 48 hours after the experiment with 6 Ss. All Ss were hypnotized after the last experiment they participated in and the suggestions were removed.

RESULTS AND DISCUSSION

As only these individuals with the highest scores on the three variables in the questionnaire were tested with the SHSS, no significant correlations were found between these three variables and hypnotic susceptibility, but the post-hypnotically estimated susceptibility correlated significantly with the SHSS-scores, r = 0,55 sign 1%. Anesthesia, criterion of spontaneous trance occurred in 7 of the 11 Ss despite the fact that the signal for hyper anesthesia was given. In an earlier investigation it was found that the effect of the posthypnotic suggestion begins already during the spontaneous trance, but in this case the effect was blocked by the anesthesia accompanying the spontaneous trance. The effect of the posthypnotic suggestion starts in this case when the spontaneous trance is over. The duration of this trance varied from 5 to 120 seconds. For 2 Ss spontaneous trance occurred although no amnesia was found. Thus spontaneous trance is not necessarily followed by amnesia. On the third day after the induction of the posthypnotic suggestions spontaneous trance occurred for 2 Ss only (see table IV:5, next page). A t-test of the differences of estimations during the first 45 seconds after the signals yielded a t = 2,68, sign 1%. The GSR-differences were not significant. The differences of the subjective estimations for the whole period were in the direction of the hypothesis, but did not reach statistical significance. When the 15 estimations were grouped 5 and 5, an increasing difference was found, which may be interpreted as a result of the decreasing intensity of the spontaneous trance. The estimations of shock-intensity before the signals were given were found to be higher than the estimations after both signals. A probable explanation is that the ST has lowered the values in approximately the same manner for both conditions.

Table IV:5 Means of estimations of shock-intensity during the first 45 seconds following the signals

	Ss	1	2	3	4	5	6	7	8	9	10	11	M
	Cond												
	S1	9,4	738	6,2	0,0	5,6	1,2	0,0	8,4	2,0	0,0	0,0	3,7
1:st	S2	10,0	12,2	7,2	5,6	7,2	6,4	3,0	7,8	3,0	6,0	0,0	6,2
Day	S1	10,0	7,2	4,8	0,0	6,6	1,4	1,4	10,6	1,2	0,0	0,0	6,0
	S2	10,0	10,8	6,2	6,2	9,2	5,2	2,0	11,2	1,0	4,6	0,0	6,0

	S1	---	12,8	9,4	0,6	---	4,8	3,8	---	2,8	1,2	0,6	4,5
2:nd	S2	---	14,6	10,4	3,6	---	5,2	11,6	---	2,0	4,8	6,2	7,3
Day	S1	---	12,4	9,2	3,6	---	3,0	3,0	---	1,4	2,2	0,0	4,4
	S2	---	13,6	10,4	5,2	---	4,6	6,6	---	2,4	4,4	2,8	6,3
	S1	---	---	---	7,2	---	4,4	8,8	---	2,6	2,2	10,0	5,9
3:rd	S2	---	---	---	9,6	---	3,0	9,0	---	2,4	4,6	11,0	6,6
day	S1	---	---	---	4,0	---	2,4	8,8	---	1,2	1,3	9,6	4,6
	S2	---	---	---	7,2	---	3,2	8,6	---	2,0	4,2	10,4	5,9

In the study about atypical behavior (Uneståhl, et al., 1971 f), mentioned earlier in this chapter, was also found that the duration of the ST was individually patterned. One S manifested progressively longer ST (10, 40 , 90 seconds), another S showed long and short ST alternatingly (150, 15, 50 seconds) and a third S was observed to have progressively shorter ST (180, 120, 20 seconds). Anesthesia and amnesia lasted during the same interval. In the study mentioned earlier on color-blindness, the posthypnotic effect was abolished by an anti-signal in the main experiment. However, in the pre-study with some susceptible Ss the signal was given on 6 different occasions with spontaneous extinction of the effect between. On three of these occasions the duration of ST was also measured. Since the relation between ST and the posthypnotic effect will be discussed in the next paragraph I have chosen here to present a comparison of ST-duration and PHS-duration.

Occasion	ST-duration	PHS-duration
1	2,0 min	2,75 hours
2	5,5 min	15,5 hours
3	10,8 min	96 hours

This subject has manifested the longest ST-duration that we have found among our studies. She had a 12 SHSS-score and was very susceptible to hypnosis but since no clear relation between SHSS-score and ST-duration has been established in any previous study, the long duration in this case is perhaps due to the frequency of signal-repetition. Before the measures were taken, the signal had been given a number of times, always releasing the PHS, color-blindness. On the three occasions when the effect was measured, an increase in duration of both PHS and ST could be observed, raising the question of a possible time-relation between ST and PHS.

ST AND THE POSTHYPNOTIC EFFECT

The posthypnotic phase can be divided into two periods; period 1 = ST and period 2 including the time from the termination of ST until the abolishing of the posthypnotic effect. The studies reported in this chapter have shown that period 1 is of very short durability, lasting only for a few seconds, while period 2 could last for hours, sometimes even days. An interesting question in this respect is whether the posthypnotic effect starts working already during period 1. In the study with the PHS about levitation of the left leg (Uneståhl, 1970 a), the five Ss showing both period 1 and 2, began the posthypnotic act already during period 1, i.e. while the anesthesia was still present. Also in the study about atypical behavior during hypnosis the posthypnotic behavior appeared together with the ST immediately after the signal was given. In the study on PHS about anesthesia and hyperesthesia, the spontaneous effect of ST (anesthesia) either worked with the PHS (S_1) or against it (S_2). The clear differences in the ratings of shock-intensity after S_1 and S_2 indicate that the posthypnotic effect also here has begun to work during period 1. All our studies in this chapter have contained PHS of type 3, i.e. signal-released PHS. In the experiment on car driving (chapter VIII), where suggestions of type B 1 were used, no indications of any ST were found. The awakening seemed here to be followed directly by period 2, while the time-delayed effect of the B 3 – suggestion seems to need a new trance to start the effectuation of the suggestion. Erickson´s findings concern mainly suggestions of type A. In the initial phase he observed certain changes in the individual´s behavior whereupon the suggested act was executed. This was follow by an awakening and a continuing of the normal activity, mostly with amnesia for the post-hypnotic act. This implies that the type A – suggestion is working only during period 1 and that period 2 never appears. Erickson does not relate whether he observed any direct limit between the initial posthypnotic phase and the elicitation of the post-hypnotic behavior. This can be summarized in a schemata, which has been called “Uneståhl´s paradigm”.

PHS	Programming	Releasing	PHS are working	
Type	Containing	Effectuation	Period 1	Period 2
A 1	Certain act	Awakening	Occurs	Is missing
A 2-3	Certain act	Delayed	Occurs	Is missing
B 1	General state	Awakening	Is missing	Occurs
B 2-3	General state	Delayed	Occurs	Occurs

This schemata is still a working-model. However, more research is needed for a conclusive evidence. A ST has in these studies been defined as the period followed immediately by the signal eliciting PHS, where the Ss manifesting a spontaneous anesthesia. The time of anesthesia was mostly found to coincide with the time of amnesia and extended over a period during which the Ss also showed several of the earlier mentioned external signs of spontaneous trance. On one hand anesthesia seemed to be a good and objective criterion of the spontaneous trance that also gave a possibility to decide the duration of the spontaneous trance more exactly. On the other hand, it is not certain that the spontaneous trance always is accompanied by anesthesia. It can be assumed that the spontaneous trance in analogy with the original trance represents a continuum from zero to very deep. Anesthesia then appears somewhere on this continuum. Anesthesia is then not necessarily a criterion for spontaneous trance but the spontaneous trance is thus a necessary condition for anesthesia. Another possible explanation is the fact that anesthesia cannot always be registered at the initiation of post-hypnotic suggestions because the trance, in some cases, is of a too short duration to allow

measurement of anesthesia.ST has also important theoretical implications for hypnosis. Theories, explaining hypnosis mainly in terms of motivation and expectation in the S and experimenter (Barber et al., 1969) have difficulties in explaining ST, since it appears completely unexpected by the subject. The many years of hypnotic history before ST was detected and investigated also indicate that the phenomenon has been unexpected by the hypnotists.

A summary of this chapter emphasizes the following points:

1. During the effectuation of some PHS a peculiar mental state seems to appear.
2. Very few studies on the phenomena, called posthypnotic or spontaneous trance (ST) have been made earlier and were limited only to observational studies.
3. I have defined ST as the period following immediately after the release of PHS during which the S manifests a spontaneous anesthesia.
4. The period of anesthesia is mostly found to coincide with a period of amnesia.
5. In spite of some support for Erickson´s reactivation theory the evidence from our data does not yield enough support to consider ST as a reactivation of the specific elements in the original trance.
6. The shortest and longest measurement ST in our studies have been resp. 2 sec. and 10.8 min. ST-periods lasting for more than 1 minute are rather unusual.
7. A tendency for the occurrence of longer ST-periods after a signal (releasing PH-effect) compared with that of the anti-signal (abolishing PH-effect) was found.
8. The posthypnotic phase can be divided in two periods, period 1 (=ST) and period 2 (end of PH-effect).
9. Period 1 is of very short duration (often seconds) compared with period 2 (often hours).
10. The PHS begin to work already during period 1.
11. At type A-PHS, ST often seems to cover the whole act, i.e. period 2 does not appear.
12. At type B – PHS, period 1 is missing.

CHAPTER V. POSTHYPNOTIC SIGNALS

To release PHS by a signal is only one of the three ways of effectuating PHS as described in chapter III. A signal can be any stimulus, given signal value during hypnosis which then serves as a cue for releasing the effect. Since the hypnotic signals are interesting phenomena it is somewhat surprising to find that not a single study has penetrated this topic. Any stimulus can be used as a signal, for instance words, meaningless syllables, shades of different colors, sounds of different pitch, motoric acts, behavior and even certain situations. It is not only possible to elicit different effects from different signals but also to vary the intensity in the effect by varying the intensity in the signal. If tunes are chosen for releasing emotions, different frequency can elicit different emotions and different amplitude can release different intensity of the emotion. To prevent any unintentional releasing of the programmed effects outside the experimental setting we have adopted three procedures:

a) Chose meaningless syllables or words from an unusual language (Chinese, Sanscrit).

b) Limited the posthypnotic effect in time or room.

c) Abolished the programming of the Ss just after the experiment session.

Depending on the function of the signals I have separated two types; signals, releasing the PHS and antisignals, abolishing the PH effect. As was shown in the previous chapter the signals seemed to elicit a longer ST than the antisignals (table 4:).

In the pre-study with color blindness (chapter IV) I detected that the S had amnesia for the signal word, why I decides to investigate this phenomenon further. As this case study was the first in an unexplored field, I will present a short summary of it. Two words, “Ishihara” resp. “Atchivo”, had been used to release the color-blindness and the sentence: “You can now see all colors” to restore the normal colorseeing. After instruction the S to listen carefully and try to remember the words the experimenter mentioned the signal words slowly several times without any result. The S was told to try to read the lips, still with no result. She, however, understood everything clearly before and after the signal the signal words. With the S in another room, the experimenter wrote the signal word on a black-board together with some other words. When the subject was instructed to read the words written on the blackboard, she could read everything except the signals. On questioning, she explained that she saw blank spots on the black-board. When the experimenter asked other persons, not connected with the experiment to tell and write the words for the S, the result was the same. While the S was looking the experimenter wrote the letters “Ishihara” and “Atchivo”. The S could through these movements understand every letter and repeat it aloud, but could not form then into a word. The board was still blank afterwards. Among the trials with the signal sentence “you can now see all colors” should be mentioned that the S could see one word at a time, if the other words were covered. The S could also see “you can now see” if “all colors” was covered. The S experienced it as very strange that words “you can now see” could appear and disappear (depending on whether “all colors” was covered or not). If the S was concentrating on the first four words and the experimenter began to uncover the rest, letter by letter, the first words faded more and after uncovering three letters (in “alla”) everything seemed blank. Applying the same procedures backward from the last letter in colors (färger”) the result was the same and everything disappeared after four letters were uncovered. In order to find out if it was the structure or the meaning of the sentence, that was important, the sentence was translated to English and German. The result was the same as in the original Swedish sentence, thus indicating that the S was blocked for the meaning and not for the words in themselves. After abolishing the programming during a new hypnosis, the S had no difficulties in repeating or reading the words. The first exploration was followed by many similar case studies with other subjects. (Here are a few examples). One S was instructed to read aloud a certain text which included the signal word. She read fast, correctly, and without hesitation the first part of the story. Half-way through three lines above the signal word she sounded uncertain and the reading went on slowly until the signal word, whereupon

she stopped, One test showed that she was color-blind and also anesthetic. Thus the trance seemed to start rather long before she reached the signal word, which se never pronounced. The signal word "Atchivo" was taken from a Russian folksong. A trial with another subject showed that the posthypnotic effect was released while the S was listening to a tape with this song, in spite of the fact that the word was not heard very clearly. Another S was unprogrammed and tested that the signal word had no effect. Some weeks later the S was asked if she still remembered the signal word, which she did not. The experimenter then gave the signal with the consequence that the posthypnotic effect was released again. A new programming was made and the S received instructions to remember and repeat the word. The signal word was later given to the S on many occasions without any effect. Evidently a spontaneous recovery of the signal value of the word had occurred. Keeping the word at a conscious level seemed to prevent more recoveries. More about blocking, especially "suggested blocking", will be discussed in the next chapter.

GENERALIZATION AND DISCRIMINATION OF POSTHYPNOTIC SIGNALS
(Uneståhl, 1971 a).

The study was aimed to investigate:

1. The generalization effect between a signal-tune, programmed under hypnosis to release a posthypnotic suggestion, and other tunes.
2. The discriminative ability of tunes in hypnosis and waking.
3. The blocking effect of the signal tune.
4. The effect of different expectations about the duration of posthypnotic suggestions.

METHOD
14 subjects with susceptibility-scores between 8 and 12 points on SHSS, form A, participated of these, 10, in the main experiment. The signal was a 800c/s-tune with a duration of 2 seconds. The posthypnotic response was 20 cm arm levitation. The discrimination ability was investigated through a series of tunes with differences from 0 to 100 c/s. Half of the group was told in advance that posthypnotic suggestions (about for instance arm levitation) usually work for 10 seconds, the other half of the group were told that the posthypnotic suggestions will work for 10 minutes. All the instructions, the induction of hypnosis and the test were given by a tape recorder.

RESULTS AND DISCUSSION

Table V:1

Number of presentations (in c/s 10Ss)	TEST-TUNES c/s	Number of responses (arm levitation)	Percentages of responses (arm levitation)	Durations (sec.) of p.h. response mean	Amplitude (cm) of p.h. response (mean)
10	400	0	0	-	-
10	500	1	10	10	2
10	600	1	10	4	2
10	700	1	10	2	1
10	725	2	20	10	1
10	750	1	10	7	1
10	775	1	10	2	1
10	787,5	2	20	20	3
50	800	8	16	22	12
10	812,5	3	30	5	7
10	825	1	10	8	35
10	850	1	10	5	40
10	875	0	0	-	-
10	900	1	10	3	30
10	1000	0	0	-	-
10	1100	1	10	1	1
10	1200	0	0	-	-

Five out of the ten Ss responded with the posthypnotic suggestion, but none of these five Ss responded every time the signal was given. As can be seen from table V:1 they also responded to tunes other than the signal. It is difficult to see any consistent line in the responding, and therefore the question about generalization cannot be answered. No relation has been found between the duration and the amplitude of the posthypnotic responses. A comparison of arm levitation as a hypnotic and a posthypnotic response showed a smaller amplitude of the response as a signal-released posthypnotic response. The results indicate that a response to the control suggestion under hypnosis is a necessary but not a sufficient condition for response to the posthypnotic suggestion.
The results concerning the second question showed no differences in the ability to discriminate tunes in the hypnotic and waking state. No clear evidence of any blocking to the tune-signal was found. Of the five Ss, responding to the posthypnotic suggestion, three received the preinformation about 10 minutes duration of posthypnotic suggestions. They had an arm levitation response with 14,2 sec. duration (mean) compared with 2,2 sec. (mean) for the two Ss, who got the preinformation about 10 seconds duration of posthypnotic suggestions. The assumption that posthypnotic suggestions of this kind will only be released if the Ss have amnesia for the given suggestion has not been confirmed in this study. Of the five Ss, responding to the posthypnotic suggestion, three had complete amnesia, one partial amnesia and one no amnesia at all. Besides one subject had complete amnesia but with no response to the posthypnotic suggestion.

RECOGNITION THRESHOLDS FOR NEUTRAL WORDS AND SIGNAL WORDS
(Uneståhl et al., 1970 b)

The two main questions for this study were:

1. Changing a neutral word to a signal word, will this alter the recognition threshold of the word?

2. Is it possible for a signal word on a subliminal level to re-method

Eight nonsense words were used with vocal and consonant changes in randomized order. Two were made into signals, two were control words, which like the signal words were presented under hypnosis and the rest were neutral words presented only before and after hypnosis. The posthypnotic suggestion (PHS), to be released by the signal words, was one inducing red-green color-blindness. This was chosen because it is easy to control the effect of every word, shown on the screen and because color-blindness is difficult to simulate. Together 16 different colors were shown and rated. Besides recognition threshold and color rating, GSR was measured. 9 Ss took part in the experiment.

RESULTS AND DISCUSSION

Table 5:2

	Mean,	9 subjects
	Before hypnosis	After hypnosis
S_1	16,81 ms	15,81 ms
S_2	18,89 ms	16,00 ms
C_1	16,44 ms	16,66 ms
C_2	16,66 ms	16,96 ms

Table 5:3

	Mean	9 subjects
	Before hypnosis	After hypnosis
Sm 1+2	17,85 ms	15,91 ms
Cm 1+2	15,81 ms	16,55 ms
Nm 1-4	17,64 ms	16,67 ms

S = signal word (S_1 = sibaha S_2 = nefefe)
C = control word (C_1 = elyvov C_2 = rybyda)
N = neutral word

No significant differences reached (Wilcoxon)

The recognition thresholds of both signal words were lower after hypnosis, i.e. after they had got signal value. For the control words the change goes in the opposite directions. The neutral words have after hypnosis o somewhat lower threshold but they were not like the signal words and the control words given under hypnosis (no significant changes). Regarding PHS six of the subjects reacted on one or more occasions with color blindness to S_1. Three of these Ss reacted on all three occasions as S_1 was given. For two of the Ss the normal color seeing always returned when S_2 (the anti-signal) was given. In all six of the reacting subjects, PHS was released or terminated by a signal word at a subliminal level at least once. In two of the Ss, S_1 and S_2 worked at a subliminal level in 5 of the 6 presentations. In 2 Ss a control word was functioning as a signal word, also at a subliminal level. In one subject color-blindness was induced by S_1 at a subliminal level, but the normal color seeing was restored when S_1 reached threshold level. In some cases it was possible to see very clear reactions in GSR-recordings when the signal words were presented at a subliminal level.

COMMENTS

One of the studies (1969 a) gave some new evidence that the stimuli which receive signal value in the hypnotic state may give an auditive and visual blocking for the signal in some subjects. These subjects also generalized the blocking to similar words and sound combinations. A study (1971 a) using tunes as signals did not show the same blocking effects as with signal-words. Another study (1970 b) showed that the recognition thresholds tended to be altered, when previously “neutral” words were given signal value, i.e. were able to release posthypnotic suggestions. Compared to control words presented immediately before the signal words in hypnosis, but of no signal value, the thresholds of the signal words were considerably lowered. The kind of posthypnotic signal and the way it has been presented did not influence proper posthypnotic behavior. Words, (nonsense syllables) tunes and gestures as signals have been used. One experiment (1974 c) has shown that even a hallucination can serve as a signal. The signal has been presented alone or more or less embedded in some context, for instance one word in a chinese song. The signal has been given by the hypnotist or by some other person not connected with the experiment. The signal has been delivered by tapes and records or in written messages. All these variations has been made without any noticeable differences in efficiency.

The possibility of using human behavior as signals which will release emotions, serving as reinforces of the behavior, will be shown in chapter VII.

This chapter has shown:

1. No study has been made earlier concerning the nature of posthypnotic signals.
2. Any simple or complex stimulus, behavior or situation can receive signal value during hypnosis and serve as a cue, releasing posthypnotic effects.
3. No difference can be seen in effect of the signal is given by the experimenter or by a person, not connected with the experiment.
4. Stimuli given signal value can cause in some Ss a spontaneous, auditive and visual blocking of the signals.
5. Various procedures to abolish the blocking have been tried without results. The only effective procedure seemed to abolish the signal value of the stimuli.
6. The blocking at meaningful stimuli, receiving signal value, seems related to the meaning and not the structure of the stimuli.
7. No difference in the ability to discriminate tunes in the hypnotic and waking state was found.
8. Recognition thresholds were lowered when previously “neutral” words were given signal value.

CHAPTER VI. POSTHYPNOTIC BLOCKING SUGGESTIONS

A.S. Peterson et al. (in Lassner, 1965) have studied the blocking of neural transmission by suggestion under hypnosis. In the first experiment they investigated if it was possible to condition the individual in spite of a suggested anesthesia. No fear reaction developed which indicates that there is a definite block of the neural impulse at some point between the skin and the cerebral cortex. In another subject who had been conditioned and who had then been made deaf for CS+ no fear reaction occurred in response to CS+. An audiogram showed that he was unable to hear tones which were adjacent to the tone for which he had been made deaf even if he increased the amplitude to 67 decibels. In order to investigate if the block was situated on the afferent side, in the cortex or on the efferent side, an experiment was devised in which deafness to a specific tone caused an acceleration of the heart rate. They presented a pattern of three specific tones each lasting a second, followed by a second of silence, followed in turn by the painful shock. However, when the sequence of the same three tones was followed by a very light tone, no shock ever occurred. The second of silence, which indicated that a shock would occur, was replaced by a high pitched tone, which indicated that no shock would take place. When, therefore, the subject was made deaf by hypnosis to the high pitched tone, the negative conditioned stimulus was replaced by a subjectively experienced moment of silence, which indicated for the subject, the positive conditioned stimulus, and so there was an increase of heart rate. Thus, there cannot be any inhibition or functional paralysis of the sympathetic. Since it appears that the inhibition is not on the efferent side, they devised a new experiment to establish whether the block was in the cortex itself, or on the afferent side. For that purpose, they measured “the average evoked response” to an auditory stimulus. The apparatus recorded a change of potential in the auditory cortex when the subject was paying attention to the clicks, but not if he is ignoring the clicks. There was no evoked response when the subject was suggested not to hear the sound. Thus, the stimulus does not reach the cortex, why the inhibition is probably on the afferent side. Hypnosis seems to cause a block in some sub-cortical center, probably in the cochlear nucleus, which prevent the impulse from the auditory signal from passing beyond the cochlear nucleus to the cortex. Blocking is one form of amnesia, which can be either spontaneous or suggested. According to Hilgard (1965) one can distinguish between a) posthypnotic amnesia for events within the hypnotic session, b) posthypnotic amnesia for the results of learning within the session c) posthypnotic source amnesia, i.e. a retention of material learned within the trance, with forgetting of the fact that it was learned and d) amnesia within the trance for earlier events within the trance, while the subject remains hypnotized. Blocking then implies another type: amnesia for a function, learned before hypnosis or an event which happened before the hypnotic session. Evans (1973) made a preliminary study to find out what happened when the Ss were blocked for a figure. Complex mental processes seemed to appear. One subject wrote the answer with Roman numerals, another subject had to write with both hands. Evans thought that the Ss used one of two different strategies.

a) the logic strategy – the Ss try their best in a difficult situation.

b) the blocking strategy – a cognitive blocking, a denial of the meaningful existence of the figure.

Evans found that simulating Ss often use the logic strategy, while hypnotized Ss use the blocking strategy. Before beginning a more systematic investigation I had encountered the phenomena of ´blocking ‘in several other experiments. In some studies (Uneståhl, 1969 a and b) a blocking-type of PHS (color-blindness) was used, where the longest duration of PHS of this type was illustrated i.e. 2 weeks blocking of the counting ability without any spontaneous recovery. The blocking, described in the former chapter, was of a different type i.e. spontaneous and not as a result of suggestions. They functioned as negative hallucinations both in the auditive and the visual areas and were mostly connected with the signals of verbal character. In order to investigate further the phenomena connected with the blocking, a special experiment was devised.

INVESTIGATION CONCERNING POSTHYPNOTIC BLOCKING (Uneståhl,et al. 1974).

From the prestudies ought to be mentioned that 2 Ss exhibited arm levitation to the signal of counting 1-10 in Swedish. They also showed the same response, but to a lesser degree when the experimenter was counting in English and to a still smaller degree when he was counting in German. As was shown

in the previous chapter, the meaning of the signal seems to be the important thing. For the 2 Ss, to whom the figure and the concept seven was suggested to disappear at the signal “beautiful”, the figure disappeared before the signal was given, perhaps in connection with the first signal, counting to ten. Possible explanations: The Ss might have misunderstood the instruction, a confusion between the two signals could have occurred or the Ss were so prepared (unconsciously) on the suggestion that it was effectuated in advance. In the prestudies a post-hypnotic hallucination was also found to function very well as a signal for a post-hypnotic behavior. It was also found that the signal and the post-hypnotic behavior can be the same thing, but no blocking of or amnesia for the signal could be detected.

MEHOD

In the main experiment 10 Ss received the PHS that the figure and the concept 6 (in Swedish 6 is the same as sex) would disappear when they heard the signal, which was 8. The nature of the blocking and the possibilities of abolishing the blocking (intensive stimulation, increasing of motivation etc.) was investigated during test period I. Electric shocks were also administered in connection with the presentation of 6 and 8, and the Ss had to estimate the shock intensity compared with a standard shock, given before hypnosis I. the first part of the test period I after the signal “8” had been given was concerned with checking of the blocking. The first tasks were as follows:

1. Count loudly 1-10 in Swedish
2. Count loudly 1-10 in English
3. Count loudly 1-10 in German (alt. French)
4. Write 1-10 with Arabic numerals
5. Write 1-10 with Roman numerals
6. Read a text (containing words like sex, Essex, sixteen, sexton, sextant, sax, etc.)
7. Counting of the fingers
8. 11 counting tasks (like 1+5, 4+4, 18:3, 48:8, 8x8 and so on)

During hypnosis II the Ss were investigated whether they could write the figures from 1 to 10 with automatic writing, and if they could count from 1 to 10. They were also asked to describe how they felt during test period I, with the help of automatic writing. During hypnosis II some new PHS were also given. If the figure 6 was still blocked, an anti-signal “12” was given, to be presented after awakening. Another PHS was that the figures 2 and 9 should disappear after awakening. The disappearance of 2 was associated with a negative feeling and 9 with a positive feeling. During test period II a personality inventory (EPI) was administered. The Ss were then tested one every half an hour to see when the blocking of 2 resp. 9 ceased.

RESULTS

It was found, in accordance with the pre-studies, that 2 Ss manifested the posthypnotic effect already before the signal had been given. In these cases the release of the effect may have been due to the fact that the Ss were exposed to figure 8 on the rating scale, which preceded the control of “spontaneous” blocking. The effect of the signal released PHS was as follows:

1) 3 Ss manifested no blocking at all
2) 2 Ss had partial blocking
3) 5 Ss showed complete blocking

As the investigation concerned the phenomena of blocking, the first group did not go through the rest of the experiment procedure. An overview of the results can be seen in table VI:1. In group 3 there were some differences, 3 Ss could for instance neither utter nor repeat 6, 2 could repeat but still did not know the meaning of 6. The inability of even repeating can be compared with the description of

blocking in the previous chapter. However, there the blocking was for the signal while here for the PHS. 4 of the 5 in the third group showed complete blocking not only for “sex”, but also for homonyms and synonyms, the 5th person only for homonyms. The prestudy shows that the blocking also covers the PHS in other familiar languages although to a somewhat lower degree (one subject less). On the other hand no sign of any spontaneous blocking of the signal word 8 was found, neither in the repeating, counting or writing performances. Intensive stimulation of the figure six and increasing motivation were tried in order to try to abolish the blocking. The 5 Ss were promised 10 – 100 Sw. crowns if they could find out which figure was missing. None succeeded and some Ss even remarked that the increased effort made it still more difficult to find the missing port. No effect was abtained by having the Ss listen to a tape-recorder where different persons repeated “six” with different speed and pitch.

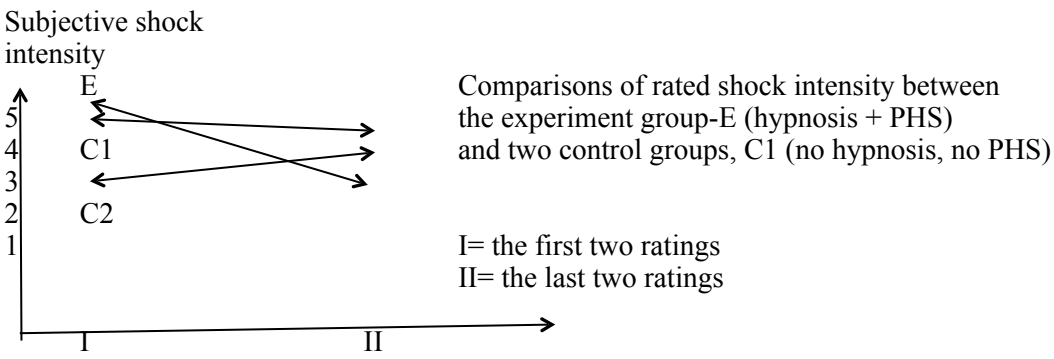
Table VI:1 Results

	No. of Ss tested	Positive reaction No. of Ss	“ambiguous”results No, of Ss
6 disappeared before the signal given	7	2	
6 disappeared in due to the signal	7	5	2
Were able to repeat the signal (8)	7	7	
Count to 10, omitting 6 in English	7	4	2
Count to 10, omitting 6 in German or French	7	4	2
Write to 10, omitting 6	7	4	
Intensive stimulation of 6, blocking abolished	7	5	2
Increased motivation to find the missing figure (money offered), blocking abolished	7	5	2
Know what “sexual” means	7	3	
6 retrieved while counting under hypnosis	6	3	
6 retrieved while writing automatically	5	3	
Blocking of 6 abolished before the antisignal (AS)	4	2	1
Blocking of 6 abolished after writing the AS counting task	4	3	
Blocking of 6 abolished after the AS given by the experimenter	2	1	
9 and 2 blocked	7	5	2
9 and 2 associated with emotions	7	5	2

Ss	1	2	3	4	5	6	7
Reading a text containing 8 critical words. No. of words read	2	3	3	7	8	8	8
6 Counting tasks with 6 involved Number missed	5-6	5	6	6	6	2-3	5
Counting fingers: results	11	11	10-11	10	11	10	10

Or by giving the Ss a typewritten paper filled with figures of sixes. Even here the Ss had some difficulties in focusing on the separate figures, the figures seemed to float. On further questioning the subjects explained that instead of figures they saw “curles”, “pipe-bases”, “music-symbols”. On turning the page upside-down all Ss were able to identify the figures as 9 without any difficulty. Two other tasks were to draw a big “6” and a face of a man, containing sixes. The results of these tasks were that the Ss more or less distorted the drawings as can be seen in figure VI:1. during this first test period, lasting for half an hour, the blocking did not cease for any of the Ss. Instead one got the impression that the blocking at the end of test period I was still stronger for some Ss than in the beginning, perhaps because the Ss were more aware and embarrassed of the blocking after having tried many methods and much conscious effort to get rid of it. The Ss were subjectively ranked in the beginning and the end of test period I according to the “depth” of the blocking. A correlation between these two rankings showed r = 0.75 (Spearman rank correlation). Electric shocks were given on various occasions during test period I and the Ss had to rate the shock intensity compared with a standard shock (5) given before Hypnosis I. to be able to compare the ratings two control groups were tested in a similar way. Control group I (CI) was only rating shocks during 40 minutes, while the other control group (CII) was hypnotized in the same way as the experiment group (E) but without any other PHS than amnesia. After hypnosis they had to estimate shocks in the same way as E and CII. The results of some estimations can be seen in figure VI:1. The slow decline of the estimated values for CI is probably due to habituation, while the trend in the opposite direction for CII may be due to c gradual decrease of after-effects from the hypnotic trance.

Figure VI:1



The strong decrease in estimated values for the experiment group may indicate an increasing involvement and detachment due to the effort of finding the missing figure. 2 Ss did not feel the shock at all on some occasions mostly in connection with the signal (8). During Hypnosis II the Ss were anew urged to count to ten, and here 3 of 6 Ss left out the “six-figure”. The method of automatic writing was therefore tried. Automatic writing is intended to be one expression for the unconscious mind. Thus a dissociation was created in the right arm, whereupon the Ss were given suggestions that the hand should move of itself without any steering from the Ss; the spontaneous movements should form the figures from 1 to 10 and also describe their feelings during the test period I. the intention of the last task was to see if this description gave more or different data compared with the ratings in test period I. 5 Ss described their feelings in a legible way but the descriptions were in agreement with the earlier “conscious” ratings. 3 of these 5 Ss managed also to produce the figure 6 in the automatic writing, which gave some support to the hypothesis that a method, where no conscious effort is involved, is more effective in breaking the blocking. Before waking new PHS were programmed. For those Ss, still being blocked, the figure “12” was given signal value with the intention to take the blocking away (anti-signal). A new post-hypnotic blocking should, however, occur, this time for the figures 2 and 9. In order to investigate further the possibilities of influencing the spontaneous return of the blocking figure, the blocking of 2 was associated with a feeling of well-being and the blocking of 9 to a feeling of inconvenience. Test period II began with counting to ten. For 5 of the 7 Ss the blocking of 6 was gone i.e. already before the anti-signal had been given. For the other 2 Ss the anti-signal (12)

was given as the answer of a counting task (7+5), given to the Ss. One of the two Ss managed to reach the figure 13 (remember that figure 2 was now blocked) and the experimenter had to administer the anti-signal verbally. The second subject broke the blocking of 6 by writing the answer 12, but it had also the effect that the blocking of 2 was abolished. All seven Ss, with an earlier complete blocking of 6, received also complete blocking of 2 and 9 after the second hypnosis. The ratings of the feelings for the two "meaningless" figures also showed that the programmed feelings were working. The hypothesis that the blocking of 9, which meant wellbeing, should stay longer than the blocking of 2, was however, not confirmed. Instead the figure 9 returned first for somewhat more Ss than the figure 2, while one subject got them back at the same time. Both figures had returned for all Ss within 2 hours. The results of the personality inventory must be interpreted with reservation due to the small sample. The degree of blocking correlated -0.33 with Extraversion, -0.66 with Neuroticism, and +0.44 with the Lie-scale (Goodman-Kruskal`s gamma). These interesting tendencies are worth further investigations as they indicate the possibility of significant relations between personality factors and single hypnotic phenomena instead of the lack of significant correlations to hypnotic susceptibility as a whole.

DISCUSSION

Of the 10 Ss, 5 Ss received complete and 2 Ss partial blocking for the figure 6 after the first hypnosis and for the figures 2 and 9 after the second hypnosis. Normally the blocked Ss seem to lack initiative to get rid of the blocking but during test period I the experimenters activated the Ss and different methods of breaking the blocking were tried. All this effort, however, seemed to have an opposite effect i.e. a strengthening of the blocking. It also had the effect that the Ss felt more uncomfortable. The ratings of the strongest unpleasantness were made during the trial to break the blocking with increased motivation (offering the Ss money, if they could find the missing figure). All Ss became aware that something was wrong. Some described the missing as "very close", "on the tip of the tongue", "in the mouth", but as soon as they had to concentrate on it, it disappeared. Test period II, with the figures 2 and 9 missing, was not rated as so inconvenient, as the Ss could ignore the blocking if they wanted. There the figures also came back spontaneously after a while. The relationship to effort can also be illustrated by two of the Ss who mentioned the missing figures "by mistake" in connection with telling their post-number and birth-number. The blocking of figure 6 was to be elicited with a signal (8) and abolished with an anti-signal (12). Some Ss received the intended effect already before the signal or anti-signals were given which may have to do with a misunderstanding of the instruction, a strong "inner preparedness" for the coming effect or that something else served as a signal (for instance figures in the rating scales). Electric shocks were given on various occasions during test period I, in order to indicate any eventual spontaneous trance. Only 2 Ss did show signs of anesthesia on some occaions, mostly in connection with the signal, but the estimation values for the experiment group, compared with the control groups (figure VI:1) may indicate increasing involvement and detachment during the test period. Some Ss reported a feeling of detachment in connection with the effort to find the missing figures and one subject rated the trance quality of test period I (more effort) as 25, and test period II (less effort) as 10 on a scale going from 0 to 100 (deep trance). Some Ss had also, during test period II, partial amnesia for the whole test period I. These observations can be discussed in relation to "Uneståhl´s paradigm" (chapter IV), where PHS of type A seems to be performed in a trance state, while PHS of type B3 only has indications of trance at the initial onset i.e. ST is there only an auxiliary mean for eliciting the onset of the post-hypnotic effect. The fact that 3 Ss managed to write 6 during automatic writing, where the right arm is detached from the rest of the body and is moving spontaneously, is in agreement with the other findings that conscious effort strengthens the blocking. On the other hand no support was obtained for the hypothesis that a blocking associated with a positive feeling should have a longer duration than the negative one. The result showed rather a tendency in the opposite direction, which may be explained of that a blocking, associated with a negative feeling, creates more irritation and voluntary effort to break it, which in turn has the opposite effect. The relation between the personality inventory (EPI) and the tendency for blocking showed some interesting trends, which ought to be investigated on larger populations. The blocked Ss had lower neuroticism scores compared with the non-blocked Ss (sign, p 0.05) and also compared with the normal population (sign. P 0.01). The hypnotic susceptibility as such has been related to all various personality factors but since no significant correlation could be found it is high time to start relating personality and other factors to single dimensions in the hypnotic susceptibility. The relationship of post-hypnotic blocking to perceptual defense will shortly be discussed. "The theory of repression" is hardly applicable, since we always used rather neutral stimuli and responses both as signals and PHS.

One possibility is, however, that the programming during hypnosis means giving the "neutral" stimuli a positive or negative emotive meaning. One argument against this is for instance that blocking of signals can occur even when they elicit positive effects. The blocking of 9, in this experiment associated with a positive feeling, was still effective. For the same reason "the theory of ego defense" can hardly explain the phenomena of hypnotic blocking. However, the 2 Ss with the strongest blocking at the end of the test period, also had the highest score on the variable "Extraversion", and the two Ss who tried mostly to reason logically had both 4 on the Stanine scale, which should be in accordance with the "theory of ego-defense", that the reaction to incongruence in perception might be either repression (extroverts) or intellectualization (introverts). However, the sample is too small to permit any conclusions in this respect. The theories of dissociation especially in the form of the neo dissociation theory of multiple cognitive control (Hilgard, 1973) seem to be better applicable to the phenomena of blocking than the theories of perceptual defense. The blocked figure disappears from the mathematical cognitive structure and then floats between different levels of consciousness.

This chapter has shown:

1. Besides the spontaneous blocking, shown in chapter V, it is possible to induce blockings of specific or general abilities with the help of PHS.
2. Posthypnotic blockings, bound to a signal, are sometimes released even before the signal is administrated.
3. The blocking can be complete or partial and may become evident in phenomena such as resistance or repulsion against the figure.
4. The blocking also covers the figure in other familiar languages.
5. The blocking may also manifest itself in the inability to repeat the blocking figure.
6. The Ss could perceive the blocking figure, sometimes with some resistance but do not interpret it as a number.
7. In drawing a big 6 or a face containing sixes the Ss distorted the drawings.
8. Intensive stimulation of the blocking figure or increasing motivation (offering money) does not abolish the blocking.
9. Increased effort in order to find the missing figure rather tends to strengthen the blocking.
10. Increasing awareness of something missing and increasing effort to find it increase the unpleasantness in the Ss.
11. Performance with very little conscious effort involved, like automatic writing, sometimes managed to break the blocking.
12. Indications for relations between the tendency of blocking and some personality factors were found.
13. The phenomena of blocking may be better explained by theories of dissociation rather than by theories of perceptual defense.

CHAPTER VII. POSTHYPNOTIC SUGGESTIONS AS REINFORCERS OF BEHAVIOR

Thorndike was the first investigator of the effect of reward on learning, resulting in the formulation of the wellknown "low of effect". His successor Skinner, founder of "Non-mediational theory", claims that "behavior is shaped and maintained by its consequences." If we realize this then we can study behavior that operates upon the environment to produce consequences ("operant behavior") by arranging environment in which specific consequences are contingent upon behavior. We can also

manipulate the environment, which often has dramatic effects. Skinner claims that the reinforcing effects of reward occur automatically, independent of the subject´s awareness of the relation response – reinforcement. Results supporting the automatic effect of reinforcement have been presented by Marx (1967), Postmon (1965) etc., while other researchers, like Dulany and Spielberger (1966), do not support the law of effect. Bandura claims that learning without awareness is possible but such learning proceeds slowly. An aware symbolic representation of the relation response – reinforcement will accelerate the learning and to a great extent influence the overt behavior. Bandura refers to an experiment by DeNike, showing quick and dramatic changes in the speed of learning as soon as the Ss realized what was reinforced. The treatment with operant techniques has mostly been applied to children and psychotic patients with the intention to develop new response patterns. Among those who criticize these techniques are Murray and Jacobsson (1971): "It is likely that response shaping and chaining under conditions of positive and/or negative reinforcement are highly efficient methods of teaching withdrawn, sometimes non-verbal institutionalized patients. However, with the greater majority on non-institutionalized patients, we could expect that instruction and modeling are more efficient methods of converging information and changing behavior". Skinner in his methods of operant techniques has mostly used external reinforces, primary like food and sweets or secondary like "tokens" of different kinds. Cautela, on the other hand, has constructed a method with internal reinforces, called "Covert Reinforcement." He tried first with aversive stimuli presented in imagination via instruction and found that they had properties similar to an externally applied stimulus. In the same way he found later that reinforcing stimuli functioned in a similar manner when presented in imagination as when externally applied. The first step is to find reinforcing stimuli, which here consist of previously experienced pleasant events and situations. Cautela`s methods are to a high degree based on the subject´s capacity for imagination and involvement. The description of the "situation" at the therapy session has a very suggestive character in order to create strong emotions. Cautela´s methods have apparently many features in common with hypnotic methods, and it is likely that "covert reinforcement or desensitization" in many Ss creates a state, which can be defined as hypnosis. Skinner´s techniques with external reinforces have some disadvantages, for instance the administrative difficulties as the methods presuppose a rather strong control of the environment. The persons in the patient´s surroundings have to know what behavior is going to be rewarded, they must observe, be consistent, react quickly with the reward, vary the reward etc. These techniques are hardly applicable to all individuals. Also Cautela´s methods involve some problems in demanding a great deal of the subjects willingness to participate actively, and a good imagination ability is also necessary. Thus, the question arises if hypnotic techniques can be used to remove some of these difficulties. From previous chapters is known that general states like emotions can be released post hypnotically. It is also known, that the releasing can occur through a signal (PHS of the type B3). In chapter V it was explained how a certain behavior can be given signal value during hypnosis and then serve as a cue, eliciting the programmed effect. Two experiments have been carried out to investigate if such a hypnotic technique can be used in modifying.

EXPERIMENT I: A POSTHYPNOTICALLY RELEASED EMOTIONS AS A MODIFIER OF BEHAVIOR (Uneståhl et al., 1971 a).

METHOD

Seven susceptible subjects, SHSS-scores = 12, participated in the study of a 2 weeks duration. On the first session the Ss were asked to narrate a happy event experienced in the past. They also solved 30 very simple counting tasks, the answers to which were arranged so that every figure between 0 and 9 was written three times. After every answer the Ss rated their feelings on a variable of discomfort – wellbeing and with steps similar to those in the scale for subjective experience analysis, used in earlier experiments. After the first meeting a control period of three days followed, where the Ss had to write forty numbers from 0 to 9 every day. The Ss should write them with twenty seconds interval and always choose the first number he was thinking of. In this way the Ss "normal" preference of writing numbers between zero and nine was obtained. The fourth day when the Ss came back to the laboratory they were hypnotized and had to revivify this happy experience they told about at their first visit. They were then told to forget the event but still keep the sense of happiness, whereupon the feeling was programmed to one of the subject´s low-frequency number. Thus , the PHS was: "Every time you write the number you will feel as happy for fifteen seconds." After awakening and after a control of the suggested amnesia the Ss had to count the same tasks as at the first meeting and also rate their feelings after every number. During the following week the Ss then had the same kind of home-work as during the control-

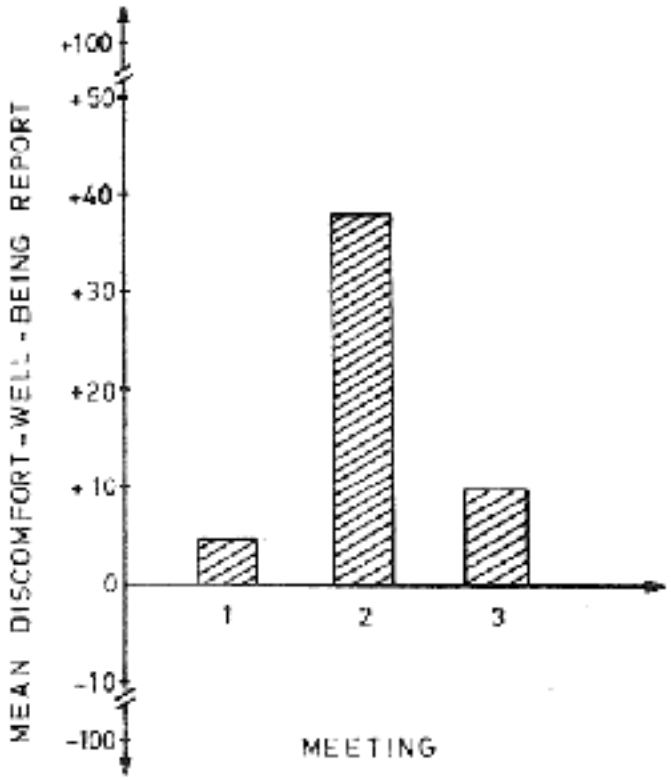
period. On the third meeting at day eleven they made the counting tasks again, whereupon the PHS were removed. An interview with the Ss terminated the experiment.

DAY 1	DAY 1-3	DAY 4	DAY 4-10	DAY 11
S asked to tell about previous happy event				S asked about awareness response – reinforcement

RESULTS

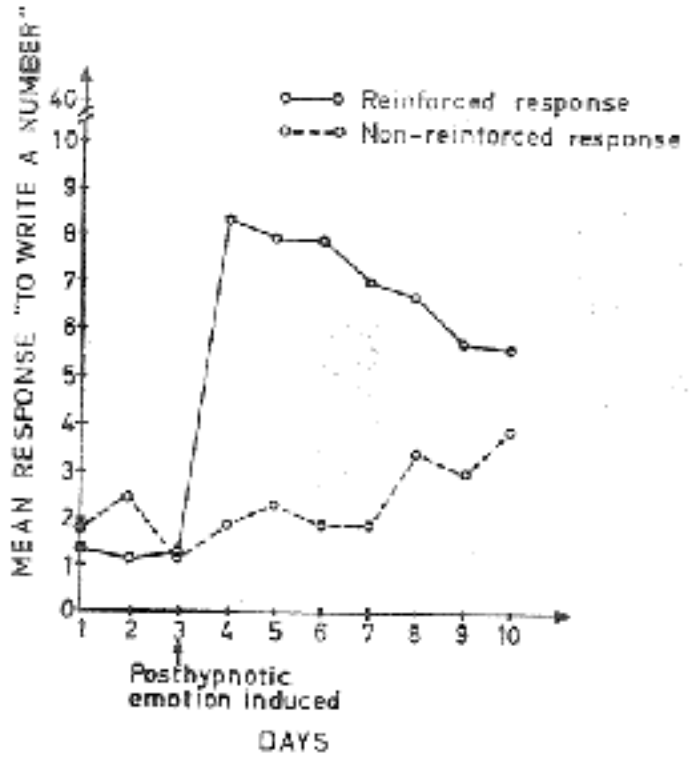
There was a significant increase ($p = 0.008$, sign. test) in rating of wellbeing after writing the "critical" number at the second meeting compared with the first (figure VII:1).

Figure VII:1 Reported discomfort – wellbeing after writing the critical number at meeting 1 (control), meeting 2 (after PHS) and meeting 3 (follow-up).



The changes in the Ss preference for writing different numbers can be seen in figure VII:2.

Figure VII:2 Average responses for ten consecutive days of the reinforce3d response “to write a certain number” and a low-frequency response which was not reinforced.



The increase in the frequency "to write a certain number" from the control to the experiment period varied from 2.1 units to 11.9 units and was significant at the 1% level (Wilcoxon´s matched pair, signed- rank test). The increase remained unchanged during the experiment days, while the intensity in the feeling at session 3 had decreased to almost the same level as before the hypnotic programming. All of the Ss had amnesia for the given PHS but during the experiment 4 Ss noticed that a certain number elicited a feeling of happiness. Three SAs seemed, however, to remain unaware of the relation between response and reinforcement, but these Ss changed their responses in a similar way as the other four Ss. With respect to the experiences from this experiment a new study was designed with some improvement in the procedure:

a) No home-work, all measurements made in the laboratory.

b) To indicate a false relation between the elicit emotion and some neutral procedure in order to make the awareness of the relation response – reinforcement more difficult.

c) To try to detect any spontaneous trance, since this has significant implication for the awareness aspect.

d) To make a more extensive interview in the end also for the question of awareness.

EXPERIMENT II: PH RELEASED EMOTIONS AS REINFORCERS (Uneståhl et al,1972 g)

METHOD

60 persons were tested with SHSS, form A, whereupon 6 Ss, scoring 11 – 12 points, were selected. 4 of them were naïve but 2 had some previous experience of hypnosis. The Ss were told to return at four successive sessions. At the first session the Ss were given an instruction over the experiment design, whereupon the Ss were hypnotized and control was made that the Ss functioned on a signal released PHS and that the Ss had amnesia after awakening. They were also asked to narrate some happy previous experience. This ´happy event´ was used at session 2 and in the same way as in experiment I connected with a certain response, this time pushing a button with a certain color. After awakening the Ss carried out the task without any hypnotic induction and at the fourth session the PHS were removed, whereupon the Ss executed the task for the last time. The apparatus consisted of a panel with six buttons of different color. All buttons were coupled to a Sawyer slide projector, containing a series of 54 slides with "neutral" geometrical figures. The Ss were informed that the projected slide was dependent on which button was pushed. In reality, all slides in the series were projected by the same projector. A tape-recorder gave a tone with an interval of 30 seconds. This was the signal to start pushing a button. The

frequency of “pressed buttons” was measured automatically. After pressing a button the Ss were instructed to estimate their emotional response to the exposed slide from the provided scale ranging from +3 to -3. In the first session all figures eliciting a positive response were excluded and only 42 figures with values ranging from +1 to -3 were used in the following sessions.

Experiment II – Time axis

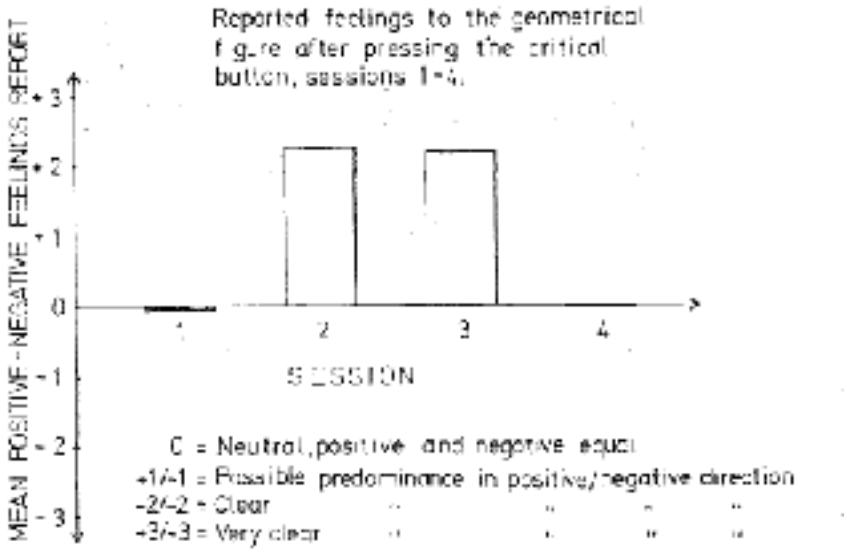
SESSION I Day 1 Control day	SESSION II Day 2 Experiment day	SESSION III Day 6 Experiment day	SESSION IV Day 7 Control Day
Test of hypnotic susceptibility Control of amnesia and PHS buttons seeing figures Rating of emotions Drawing the figures a happy event Pressing Telling	Hypnosis PHS Control of amnesia Pressing buttons seeing figures Rating of figures Drawing the figures	No hypnosis Pressing buttons seeing figures Ratings of emotions Drawing the pictures	Hypnosis Removal of PHS Pressing buttons seeing figures Rating of emotions Drawing the figures

Every slide was exposed on the screen for a period of 3 seconds, while the feeling of happiness was programmed to work in 15 seconds. After removing of the slide, the Ss were instructed to draw the exposed geometrical figure. The purpose of this was partly to conceal the real purpose of the experiment, but also to investigate any appearance of spontaneous trance (ST), thereby providing clues to the question if learning does occur without the SS awareness of the relationship between the response and the reinforcement.

RESULTS

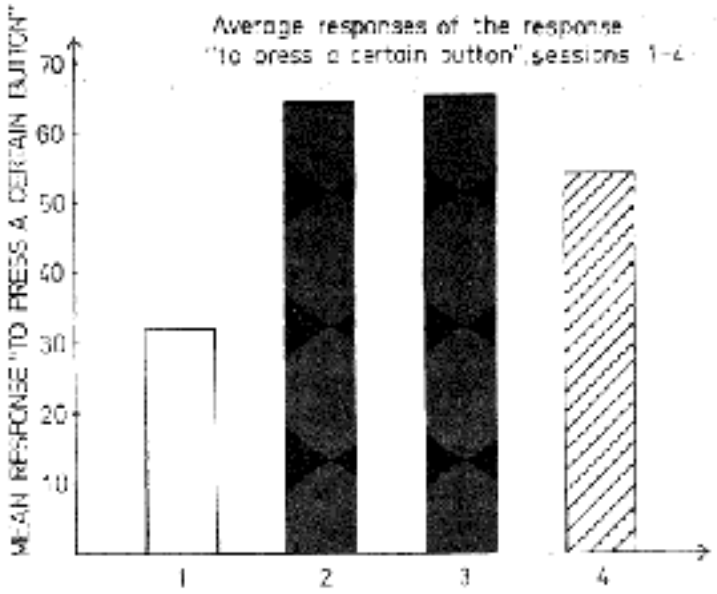
All Ss had amnesia for the given PHS and in all Ss the PHS was effectuated so that pressing a certain button released a feeling of happiness, which was reflected in the subjective ratings (figure VII:3).

Figure VII:3



All Ss had a very clear change in rating scores during the two sessions, where the PHS were working (variations from 1.75 – 2.9). The PHS had no significant decrease in strength from the second to the third session. Two Ss had exact the same value and one S even a slight increase. Regarding the frequency of the response "pressing a certain button" there was also a significant increase for all Ss (Figure VII:4).

Figure VII:4



The increase from session 1 to sessions 3 and 4 is significant at the 5 % level ($p = 0.05$, Wilcoxon matched-pair, signed-ranks test). The response has also significantly increased at session 4 (5 % level), in spite of that the PHS is here removed. The final interview showed that all Ss seemed to be unaware of the relation response – reinforcement. The Ss could not guess the purpose of the experiment either.

DISCUSSION (both experiments)

In the two related experiments post hypnotically elicited emotions serving as reinforces of behavior have been studied. The results of both experiments apparently show that the released emotions have a modifying effect on the frequency of the behavior. The increase of the "critical" response was significant for all Ss (Figure VII:2, VII:4). A difference can however be seen in the persistence of the increased response-frequency. In experiment I there was a slight lowering of the critical responses for the majority of the Ss during the 5 experiment days. In experiment II the increase was unaltered during the experiment, which had about the same duration as experiment I. The Ss in both experiments had been programmed to feel a happy sensation during 15 seconds after the critical response. This feeling was elicited in all Ss and to a very clear extent (figure VII:1, VII:3). Even here the ratings persisted at the same level in experiment II, while they decreased in each subject during the experiment week in experiment I, so that the estimates were at meeting 3 almost at the same level as at meeting 1. At the last session the PHS were removed in all Ss, whereupon a new control of the critical response was made in experiment II. In spite of ratings showing that the Ss were no longer reacting to the previously provoked emotion, the response was still at a significant higher frequency. Thus, the occurred learning lasted even without this kind of reinforcement. The hypothesis that the reinforcement can be effective even without the Ss awareness of being reinforced has got a positive support. The 3 Ss in experiment I who remained unaware of the relation response – reinforcement had also a significant increase and as the relation response – reinforcement was made still more diffuse in experiment II, non of the Ss got aware. Non of the experiments was designed to measure spontaneous trance (ST) but as one criterion of ST is amnesia and as the Ss in experiment II were asked to draw the figure they just had seen on the screen, then this procedure could be used as one indicator of ST. Only one S made wrong pictures of some of the reinforced figures, while drawing everything else perfectly. Four conceivable explanations to the weak result in this respect are:

a) ST did not occur in this experiment

b) ST may have occurred but during less than 3 seconds, which means that the Ss will still remember the figures

c) ST occurred and lasted more than 20 seconds, and therefore the Ss draw the figures, still in trance.

d) The perception of the figure can be transferred from ST to non-trance

From experiment I can be reported that the S with the lowest increase in response-frequency explained this low increase with the statement that she found it unpleasant to enter the state of trance that she felt followed upon the critical number.

Before applying these methods in clinical settings some further questions have to be answered. In these investigations the releasing of emotions was limited to positive ones. Will negative feelings like discomfort, which can be needed in treatment of problem behavior, have the same results? Here only high susceptible Ss were used. Can the method also be applied to less susceptible individuals? Here the experiment period was very short. Will the results be persistent also in a longer follow-up? Here the reinforcement was followed after each response. Can other forms of reinforcement schemata be programmed with this method? The advantage with using PHS in this area is obvious. Compared with the methods of "token economy" this method is administratively much more simple. That is valid even compared with Cautela´s technique, which needs long and intensive training. A "token" is not reinforcing in itself, it is only reinforcing to the extent that is causes a positive feeling. The PHS-method does not need this roundabout way, it creates directly the desired feeling. "It gives also a better control over: (Uneståhl, 1972 b).)

1) The kind of effect

2) The intensity of the effect

3) The duration of the effect

4) The exact point of time for releasing the effect.

By using the behavior as the releasing signal, the positive or negative effect, serving as reinforcement for the behavior, will appear immediately and automatically with no need for the therapeut or any other person to be present.

This chapter has shown:

1. A behavior can be given signal value during hypnosis and the serve as a cue, eliciting a programmed emotion.

2. A positive emotion can be separated from a previous event and bound to a certain behavior, which will release the emotion during o fixed number of seconds.

3. After programming such a reinforcer, the “critical” response increased significantly in both experiments.

4. The increase of response-frequency seems to last as a result of learning even after removal of PHS.

5. The reinforcement was effective even for the Ss who never got aware of the relation response – reinforcement.

6. In spite of some limitations the method has great advantages compared with “token economy” or “covert reinforcement”.

CHAPTER VIII. MEASUREMENTS OF POSTHYPNOTIC EFFECTS.

Hypnotic research has above everything been concerned with the investigation and the explanation of the hypnotic state, various hypnotic phenomena and the susceptibility to hypnosis (experimental hypnotic research).

In recent years, however, hypnosis has been increasingly used as an experimental tool to study other problems in psychology (instrumental hypnotic research). Not only has research on hypnosis produced results of value in other areas not involved with hypnosis, but hypnosis itself is an experimental tool which gives up rise to new research areas and offers ways of answering questions that might otherwise seem insoluble. The point is simply this: If a legitimate psychological problem can be solved better by using hypnosis than by using other approaches, then hypnosis should be used. This is not hypnosis for the sake of hypnosis, but hypnosis for the sake of advancing psychological knowledge. Especially posthypnotic suggestions of the B-type can be of considerable value for research in many fields as they offer a tool to influence the waking state and create such general states that it is often difficult and sometimes even impossible to create with a non-hypnotic experimental procedure. in this chapter four experiments will be shortly described, in which subjective states of alertness, fatigue, motivation, self-confidence etc. are induced and controlled by PHS. The subjective feelings, as a dependent variable in relation to PHS as independent variable, are then in their turn considered as independent and the effect of these states on the dependent variable, different aspects of behavior or physiological reactions, are measured.

The four investigations are:

1. Post hypnotically induced fatigue.
2. The effect of motivation and self-confidence at a physical work test.
3. The effect of different posthypnotic suggestions on car-driving in simulator.
4. Physiological measurements of hypnotically induced emotions.

I. POSTHYPNOTICALLY INDUCED TIREDNESS (UNESTÅHL 1968,b).

Despite the fact, that everyone has experienced fatigue, it is bath a complex and difficult phenomenon to define and so far no satisfactory definition has been found. Three related phenomena are included in the concept.

1. Fatigue as subjective experience, going from more localized sensations over to a generalized sense of drowsiness and decreased arousal.
2. Physiological fatigue, encompassing changes in organic functions and production of chemical substances.
3. Performance fatigue, an external manifestation in form of reduced output (work decrement). This can be measured as decrease in amplitude, speed or precision.

The changes in performance can be measured by:

a. Measuring the task continually.

b. Periodical input of a task during continual work.

The second method is less influenced by effects of practice, motivation or boredom.

Bartley and Chute presented already 1947 over 30 theories of fatigue and several more have appeared since then. In the textbooks about fatigue (Smidtke 1965, Kleitman 1963, Oswald 1962, Floyd and Welford 1953m Bartley and Chute 1947) there is not one theory covering all phenomena of fatigue. Different researchers have stressed different aspects, for example (Bartley 1947):

1. “Fatigue seems to be one of those phenomena containing a complicated social component which we cannot reliably measure but which we have no difficulty in recognizing. A subject´s simple statement that he is fatigued is a primary datum and very much more reliable than any measurement yet suggested in this symposium.” (G.Waid) “The subjective feeling is not a symptom on fatigue but fatigue itself.” (Bartley)
2. “Fatigue is a general sensation, which is felt in the muscles and joints all over the body. It is believed to be due to the accumulation of waste products in the blood.” (Good enough)

3. “Fatigue is the reduction in the output of work as the result of work and which is recoverable by rest.” (Poffenberger 1942) H.O. Lisper (1966) prefers to speak about fatigue in terms of activation, direction of attention, level of stimulation, physiological fatigue, muscle fatigue, general condition, expectancy and task demands. The most common method in experimental production of fatigue is sleep-deprivation experiments by saying that earlier investigations had not in any way showed any effect on performance by sleep-deprivation. Since then many studies have been made stressing the output. The effect of sleep-deprivation has illustrated a decrease when the subjects were given more stimulating tests, by feedback, by decreasing the predictability of the tasks or by increasing the value of reward for the tasks. The task duration also seem to be very important. Summarizing his experiment Wilkinson (1964) point out that no significant decrease in efficiency even after long deprivation periods has been no led in tasks and tests shorter than ten minutes.

METHOD

10 susceptible Ss took part in the first experiment, while 6 Ss with no pre-screening for hypnosis participated in experiment II. Subjective ratings were made but the emphasis was put on different performance-tests; in experiment I reaction time, numerical speed and visuomotoric speed and in experiment II perceptual speed, motoric speed, word in one minute, short time memory, rated eye level, time-estimations and flicker fusion. The reaction time (RT) was measured by foot reactions to auditive stimulation. The subjects foot was fixed in a certain position near the contact. The auditive stimuli were spaced by a timer, where the duration between two stimuli was determined by the discharge course in a condenser. After every stimulus a relay changed the pause resistance (22 different), thus different intervals between the stimuli were obtained. By a switch one could shift between four different condensers and in this way a linear time extension was abtained between the various inter-stimuli-intervals. An impulse from the timer gave the signal and started at the same time a decade counter. Pushing the contact gave a stop impulse to the signal and the counter. The RT was automatically delivered by a Kienzle printer. The position 1 on the timer was used. Post hypnotically induced fatigue was in the first experiment compared with “normal” and in the second experiment with “normal” and posthypnoticlly induced alertness.

RESULTS

Experiment I

Subjective scalings were used to show that the PHS were effective figure VIII:1

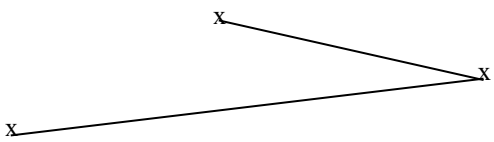
Figure VIII:1 Estimations during exp. I (group mean 10 Ss).

Never felt so alert before	Not tired at all	Somewhat tired	Very tired	Never felt so tired before

“Normal”

PHS-fatigue

PHS-alertness



Reaction time (RT)

Table VIII:1 RT during normal and posthypnotic fatigue (msec)

	Mean	Median	Deviation	Mean (1-50)	Mean (50-100)
“Normal”	354	345	61	337	372
Fatigue	602	577	148	577	627

The RT-measurements give a very clear and significant difference between the two conditions. Also the deviations increase during fatigue and the increase is larger than for the mean. The index T_M is for "normal" = 0.17 and for fatigue = 0.25. A comparison between the means and the medians shows that the distribution of RT-values is in accordance with normal distributions. The medians are generally somewhat lower than the mean, i.e. the distribution is somewhat positively skewed. The skewness coefficient is for the "normal" condition = 0,46 and for the fatigue condition = 0,49. Calculations of the medium faults of the means also show that all median values are inside the limits of the probable error of the means (5%). A comparison between the RT-distributions for every subject also shows good accordance between the two conditions. The results on numerical speed show a 30 % decrease (4 % - 59%) in number of counted tasks (sign. 1 %) in the fatigue condition. A small, not significant, increase of number of faults appeared. A small, but not significant increase in time, appeared also in the test on visuomotoric speed during fatigue. The Ss were ranked according to their degree of change in results from "normal" to fatigue. The highest correlation appeared between subjective ratings and reaction time (0,60).

Experiment II

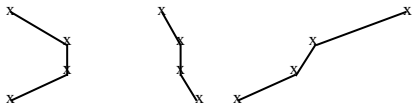
The subjective ratings were repeated four times in every condition figure VIII:2

Figure VIII:2

Never felt so alert before	Very alert	Somewhat alert	Somewhat tired	Very tired	Never felt so tired before

Before induktion

0 min
15 min
30 min
45 min



"Normal", no PHS
After PHS about alertness
After PHS about fatigue

Some ratings on the scale for subjective experience analysis (Dureman) have been presented earlier in chapter III. In order to get an opinion of the subjects motivation, they had to estimate how interesting or dull they found every task. Only small changes could be seen between the three conditions and from session one to the third and last session.

Table VIII:2 The results on performance tests during exp. II (6 Ss).

	"Normal"	Fatigue	Alertness
Numerical speed-number (faults)	39,3 (3,3)	38,7 (3,7)	44,7 (1,7)
Perceptual speed-number (faults)	80,8 (3,0)	78,2 (2,3)	82,2 (3,0)
Motoric speed-number	253	252	263
Number word in one minute	40.6	42,0	48,8
Rating of eye-level	165,0	163,8	164,2

Short term memory (CUB)	18,2	17,0	17,3
Flicker fusion	44,0	43,2	43,8

Time-rating (sec.)
Objective time/ Subjective time

5	4,3	5,4	3,7
15	11,4	13,7	11,1
30	21,1	25,4	22,3
60	40,0	46,5	41,5

Very small differences between the conditions appear in experiment II, especially in the performance tests. The deviations in the subjective ratings are also smaller than in the first experiments. This may be due to the selection of subjects as only the Ss in exp. I were selected according to their susceptibility to hypnosis.

DISCUSSION
In investigating the effect of fatigue on performance and experience previous studies had tried to create the sensation of fatigue by using certain procedures such as preventing the subjects from sleeping. In these two experiments PHS were used to elicit the desired feeling, fatigue directly. Hypnosis is here only used as a tool for inducing and controlling experiment variables. The effect of the hypnotic procedure was checked by various subjective estimations both of variables, directly corresponding to the given PHS, but also of variables, covering other dimensions of the elicited state. The effect on performance was much larger in exp. I. This can not only be a result of the fact that other tests were used, as the result on numerical speed, being measured in both experiments, decreased 30% in exp. I during fatigue but did not change at all in exp. II. The difference in results is probably due to the selection of Ss, in exp. I selected according to susceptibility to hypnosis but not in exp. II. Among the capability tests the biggest effect was observed when measuring reaction time when an extension at on average of 250m/sec. appeared. This must be regarded as remarkably large since the delay in time measured even at very long deprivation times seldom is beyond 100 m/sec. The extension of RT in these experiments was mainly the result of some very long reaction times (blockings). The mean increased while the median remained rather unchanged, the normal distribution of RT was, after sleep deprivation replaced by a more distorted distribution. After post hypnotically induce tiredness on increased RT was apparent right from the start. This is not as in sleep deprivation caused by some very long T:s but depends on a general reduction of the reactivity. The distributions and the form of the curves are similar for the Ss in the different conditions. The median increased almost as much as the mean and the skewness coefficient is only slightly larger during fatigue (0,49) compared with “normal” (0,46). The correlation between the estimated experienced increase of fatigue and the extension of reaction time was 0,60. In experiment II some differences in time-estimations appeared. During fatigue there was an increase of the subjectively experienced time. As the Ss normally underestimated the time and still more being alert, the best accordance between subjective and objective time is obtained during fatigue. The method of inducing fatigue by PHS is administratively much simpler than the use of sleep deprivation. These latter experiments are very laborious for both the subjects and the experimenters and they do not always create the desired state in spite of long deprivation times. The fluctuations of the wakefulness level are often of such magnitude that the Ss do not feel tired at the moments of testing. PHS give a better control over the subjective state and give also a possibility to vary the elicited psychological state in regard to initial strength, working level and working duration.

II THE EFFECT OF MOTIVATION AND SELF-CONFIDENCE AT PHYSICAL WORKTEST
(Uneståhl, 1970, c).

Earlier investigations have illustrated that physical capacity increases when the Ss are highly motivated (G. Borg, 1964, 1967). Gunnar Borg has proposed that the motivation for work = real motivation – expected performance. Establishing a relation between motivation and performance is however aggravated by the fact that the relation can be supposed to vary according to type of performance. “It is to be expected that no clear linear relation exists between performance and motivation and that for some types of activities the relation is clear curvilinear relation”. (1973, c). The few investigations in the area, especially concerning self-confidence and

performance variables, can be explained by the difficulty in manipulating motivation and self-confidence variables when the technique of PHS is not to be used.

METHOD

In this experiment, where 10 medium and high susceptible Ss participated, the motivation and self-confidence variables were varied and combined in the following way:

A. Low self-confidence – Low motivation (Ls - Lm)
B. High self-confidence – High motivation (Hs - Hm)
C. Low self-confidence – High motivation (Ls - Hm)
D. High self-confidence – Low motivation (Hs - Lm)

The order of these four conditions was rotated among the 10 Ss. The effect of the PHS was measured on subjective scales and the effect of the subjective states was measured with a physical work test, a clinical test where the Ss have to cycle on a ergometer bicycle with increasing resistance. During and after the performance EKG, pulse, heart activity and blood pressure were registered. The experiment was carried out in the clinical-physiological laboratory at the central hospital in Örebro and the physiological measurements were made by the physicians and staff nurses.

RESULTS

Subjective ratings:

1. After eliciting the PHS ratings were made on a modified version of Dureman´s scale for subjective experience analysis. The results can be seen in table 8:3. The differences between the four conditions are clear but not very large. The lowest self-confidence is combined with high motivation, not with low. On the other hand is Ls – Lm the subjective state which is experienced as the most unpleasant one.
2. After the physical work-test the Ss had to rate the test in three variables and then estimate their self-confidence during the test. If the Ss´ratings on every variable, consisting of five steps, are added (0-50 points), the results will be table VIII:3

Table VIII:3 Ratings of the physical work-test and self-confidence.

(Higher points = More of the variable.)	Nice	The test was Tedious	Interesting	My self-confidence during the test was
Ls – Lm	30	31	23	27
Ls – Hm	34	32	28	26
Hs – Lm	28	29	23	37
Hs – Hm	38	30	32	39

The states of high and low self-confidence are well reflected in the special rating of self-confidence and the levels of motivation are best reflected in the ratings of interest.

Physical work test

The results can be seen in table VIII:4

Table VIII:4 The exertion and pulse (Watt/pulse) during the different conditions. Maximal work.

S	Ls – Lm	Hs - Hm	Ls – Hm	Hs – Lm
1	250/183	250/195	250/182	250/180
2	300/183	300/185	300/188	300/183
3	300/190	300/190	250/188	300/189

4	200/187	200/182	200/182	200/192
5	200/190	200/190	200/187	200/183
6	350/185	259/182	300/184	-
8	130/180	130/176	130/140	130/179
9	250/195	250/187	150/183	200/154
10	150/175	200/201	200/195	200/189
12	160/178	160/176	160/177	160/180

(Woman)

(Woman)

No apparent differences between the four conditions can be seen in the table. A comparison over the conditions between sessions 1 and 4 yields the following values (table VIII:5)

Table VIII:5 Pulse at maximal exertion.

S	1	2	3	4	5	6	7	8	9	10
Session 1	183	185	189	192	190	182	179	186	183	180
Session 4	180	183	178	182	183	164	176	154	168	176

A significant pulse decrease occurred from session 1 to 4, due to training effect.

DISCUSSION

The lack of influence of the created subjective states on the physical work test may possibly have at least three explanations; motivation and self-confidence can to a very small degree influence the results of the physical work test, the post hypnotically induced subjective states are of a different kind compared with “real” feelings, the PHS could not create the desired state in the Ss. In order to see if the third explanation was of same importance, a follow-up was made with one of the Ss. The lack of effect of PHS, can be due either to the susceptibility to hypnosis or to the content of PHS. For that reason one of the most susceptible Ss was chosen and the content of PHS was somewhat modified. The content was more intensively emphasized, the description was made more in detail and the sentence: “You will always make your best” was removed and instead given after hypnosis. The result was that the subject rated the subjective variables with maximum deviations (100). The result compared with the previous sessions:

Ls - Lm	Hs - Hm	Ls - Hm	Hs - Lm	Ls - Lm	(follow-up)
160/178	160/176	160/177	160/180	130/162	

The subject first refused to work at all, but agreed after a while to make a try. Reaching an exertion of 130 W she reported that she was completely exhausted and refused to continue. She had not by then reached enough pulse-rate required for the maximum exertion. The pulse at 130 W was however consistent with previous pulse-rate at 130 W. thus the third explanation can be doubted. As other experiments have indicated that post hypnotically suggested feelings are experienced as "real", the first explanation is probably the most important, i.e. the level of motivation and self-confidence developed in this experiment, does not seem to influence the result of the physical work test in such a way that the differences between the conditions will be significant. This gives rise to the pending need for exploring the exact relation between these two variables and different kinds of performances.

THE EFFECT OF DIFFERENT POSTHYPNOTIC SUGGESTIONS ON CARDRIVING IN A SIMULATOR (Uneståhl, 1968).

METHOD

Conditions

After a practice session in the driving simulator, the subjects were tested under nine different conditions:

1. Normal
2. Increasing fatigue
3. Alertness
4. Anxiety
5. Self-confidence
6. Lack of self-confidence (diffidence)
7. Drunkenness
8. Hypnosis
9. Normal

Each condition included:

1) Induction of hypnosis with posthypnotic suggestions about the character of subjective feelings after waking.
2) Subjective scaling
3) Seven minute´s continuous driving (driving for seven minutes)
4) Description of the subject´s state while driving

Each experiment started with a "normal" condition, or control, and ended with a condition which was identical to the control condition in every respect, with the exception of the presence of posthypnotic suggestion. These two conditions are designated "1" and "9" respectively. All other conditions, those designated 2-8, were presented so that the order was varied between subjects. The group mean of the varied conditions was kept constant, however. Condition eight, hypnosis, was followed immediately by the simulated driving conditions, with no intervening, waking period. No subjective scaling was done during this period.

Measurement

A. Subjective scaling

A scale for the subjective analysis of experience (Dureman) was used.

B. Behavioral variables

1) Brake reaction time in msec.
2) Number of times subject drove off the road.

C. Autonomic measurements

1) Pulse
2) Respiration
3) SRL
4) SRR

Apparatus

A. Car simulator

The subjects sat in a comfortable chair in front of the simulator. From this position, the subjects could see a black road, 3 cm wide, through a round window, 8 cm in diameter, that was located on the simulator´s front. The 1 cm wide car was connected to a steering-arm that had two photo-electric cells which were activated when the car left the road which subjectively appeared to wind and curve and straighten. Every time the car left the road, an automatic device registered the event and produced an auditory signal. Speed and visibility were not varied during this experiment.

B. Instrument for measurements

1. Reaction time

The auditory signal was presented randomly by a tone generator. The reaction time was recorded by a decade-counter.

2. Heart rate

A small lamp and a photocell were placed on the subject´s ear.

Subjects

Six students were selected from forty subjects on the basis of their scores on the Stanford Scale of Susceptibility. only subjects with the maximum score (12 points) were chosen, because of the necessity of achieving a state of amnesia in respect to certain suggestions.

RESULTS

All subjects reported that amnesia resulted from the posthypnotic suggestions. The posthypnotic states affected the three types of measurements: subjective scaling, physiological measurements and behavioral variables. The results of the physiological recordings will be related in chapter IX.

A. Subjective scaling

The mean rates for all conditions are presented in Figure VIII:2 Figure 1 shows rather large differences between rates measured under different conditions. Half of the thirty-six mean rates fell between the categories “Moderate but quite clear difference” and “Marked difference”.

B. Physiological measurements

The values on the four measures during different conditions can be seen in table VIII:5.

Table VIII:5 Physiological measurements (Means Ss – min.)

Condition	Breathing	Pulse	SRL	SRR
Driving	20.3	89.5	51.0	6.9
Hypnosis induction	12.0	87.0	51.3	2.2
Posthyp. suggestions	14.1	89.5	54.9	4.5
Sleep	12.6	87.0	53.1	5.0
Sleep (last minute)	12.4	87.0	53.8	2.4
The minute after contact	13.2	90.2	53.5	6.6

The induction and the sleep period are characterized by lower pulse and respiration, less SRR and higher SRL compared to the driving period. All measurements change towards a lower arousal under hypnosis and sleep. The greatest difference can be seen in respiration and SSRR, while SRL shows rather small differences. The induction period and the suggestion period give a somewhat different picture. All four physiological measurements indicate a higher activation level in the organism during the period when posthypnotic suggestions are in effect. The physiological scores from the sleep period are similar to those during the induction period. The figures from the last minute of the sleep period show, however, a continuous decrease of the activation level. In the moment when the contact with the sleeping subjects is reestablished, a reaction on some or all measurement variables can be seen. The scores from the minute after establishing contact show an increase in the activation level. In the moment when the contact with the sleeping subjects is reestablished, a reaction on some or all measurement variables can be seen. The scores from the minute after establishing contact show an increase in the activation level. Observation of the subjects under this condition indicated an increasing fatigue as typified by periods in which blinking increased that alternated periodically with periods when there was relatively little blinking. The soft, continuous wheel movements were replaced by more violent angular movements. Also, body reactions to signals (tone for driving off the road) became more violent. After several minutes the head began to sink forward, the eyes began to close for short periods which were broken by attempts to wake up and open the eyes as wide as possible. An interval with short sleeping periods, though the subjects still managed to stay on the road, was followed by a period when wheel movements stopped and the subjects were asleep. At the end of every hypnotic period, the subject was told: “Now you can take three deep breaths, awake and experience what I have told you.” The number of deep breaths in connection with waking varied between three and four. Awakening time varied between 13.3 and 22.8 seconds, though some individual differences are noticeable. Awakening times seem to depend upon posthypnotic suggestions. The data in table VIII:6 seem to indicate that positive suggestions produce faster waking times.

Table VIII:6 Awakening time for different conditions

Condition	Awakening time (sec) (M_{Ss})

Drunkenness	20.0
Diffidence	18.5
Anxiety	18.3
Fatigue	17.7
Self-confidence	17.0
Alertness	15.9

The physiological changes upon awakening can be seen most clearly in SRL and pulse measurements. Deviations toward lower SRL and increased pulse rates usually come at the end of the last deep breath but have been seen to occur after the first or second breath. The size of SRL deviations vary from rather small decreases to as much as 30 KΩduring 5 seconds. Pulse rate changes may vary from little or no change to 150 beats per minute.

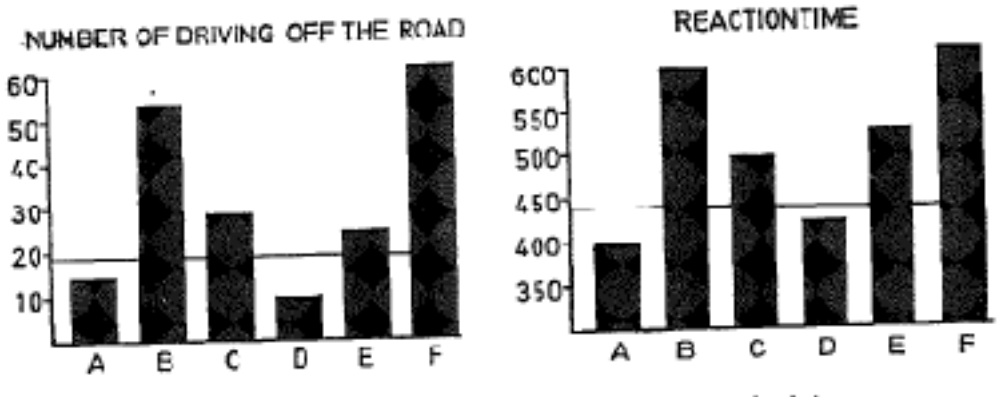
Table VIII:7 The condition: Increasing fatigue and sleep.

Condition	Breathing	Pulse	SRL	SRR	
Fatigue (total)		17.3	87.9	59.4	6.4
Last minute of fatigue condition	17.8	93.6	46.4	7.8	
The first minute of sleep	13.8	86.8	51.3	7.4	
The sleep-period	12.6	87.0	53.1	5.0	
The last minute of sleep	12.4	87.0	53.8	2.4	
The minute after contact	13.2	90.2	53.5	6.6	

The physiological scores in table VIII:7 are in agreement with the observations of subjects under the condition of fatigue. Attempts to maintain effective behavior as long as possible, in spite of continuously increasing fatigue, caused compensatory arousal (see line 1 and 2 in table VIII:7). The physiological scores under conditions of fatigue therefore change in the opposite direction to scores under other conditions. After that, the onset of sleep progresses rapidly. This can be seen by comparison of the minute before sleep (line2) with the minute after (line 3). During the 3 or 4 minutes of sleeping the scores indicate a continued decrease of the activation level (line 4 and 5). When contact is resumed the physiological apparatus shows one or more deep breaths, a temporary increase in pulse rate, lowering of SRL and one or more SRR reactions. Changes can also be seen in scores from the minute after contact, which would normally show the signs characteristic of general suggestions to relax.

C. Measurements of performance

The variables “reaction time” and “number of mistakes” (driving off the road) were measurements of driving ability that were strongly affected by the different states (figure VIII:3).



Cardriving in a simulator under posthypnotic induced states.

A = Alertness	D = High selfconfidence
B = Fatigue	E = Low selfconfidence
C = Worry	F = Drunkenness

a. Reaction time

Figure a shows that the values of the reaction time vary between 395 and 625 msec. the vertical line in the figure “normal behavior” is the mean of normal conditions I and II. The following conditions show deterioration when compared with the normal behvior: fatigue, drunkenness, lack of self-confidence and anxiety. The behavior is better than normal when the subjects are driving under hypnosis, when they are alert and have self-confidence. A comparison between the first and the second part of the period show an increasing RT for four conditions and a decreasing RT for the other five conditions. There is a tendency for the RT to increase under conditions with states that are characteristically negative. The deviation scores vary between 50 and 123 msec. these variations show a strong agreement with the differences between the means.

b. Driving off the road

The number of times that a subject drives off the road shows a variation between the conditions that resembles the variation between reaction time scores. Table VIII:2 and Figure 2 show a variation from 9.5 to 63.3 for driving off the road during a seven minutes period. Compared with the normal scores, which is the mean of normal conditions I and II, the driving is worse when the subject is drunk, fatigued, worried or lacks self-confidence; while the driving is better than normal under good self-confidence, and under hypnosis and alertness.

DISCUSSION

Of the types of measurements used in the experiment, the subjective estimations and the capability measurements show the clearest differences between the different psychological states elicited. Of the conditions there were only two whose posthypnotic suggestions had their direct counterparts on the estimation scale, alertness and tiredness.

These conditions also showed the strongest estimation deviations, namely an average of "Decided difference" from the normal state on the scale, alert, awake – drowsy, dull. The suggestions of the other conditions did not have direct counterparts of any estimation variables, but these cover different dimensions of the elicited psychological state. Also these variables showed more or less strong deviations for each individual and this indicates that the S investigated and described his actual state and not the specific suggestion that elicited the state. This is confirmed by the subjective description and by the fact that there were Ss who upon awakening, had amnesia for the given suggestion. The psychological state used in the experiment was elicited by a summarizing term with no description of how the Ss were supposed to feel. The posthypnotic suggestion was, in fact, attached to each individuals reference frame, his earlier experience of the state which he associated with certain denomination. As the inter-individual accordance of the meaning and sense of words can vary considerably, it is impossible to avoid the fact that the same posthypnotic suggestion elicits somewhat different states in different individuals. The posthypnotic suggestions used in this experiment are very common and often used terms and one can presume that the inter-individual accordance is here rather good. This assumption is confirmed by the results of the estimations where many accompanying variables, that is estimation variables, that have not been directly sugested, still show complete accordance between the Ss regarding the direction of the estimations. For instance, in the estimation variable "Concentrated, efficient unconcentrated, inefficient", all Ss rated in the same direction Alertness, Tiredness, Self-confidence, Diffidence, and Drunkenness. The suggestion of drunkenness shows the biggest variation in experience in the Ss. This is probably due to the fact that this is a state that is objectively shown by $^{0}/_{00}$ in the blood but the experience shows great individual differences. It was mentioned in chapter I that many investigations have attempted to describe physiological characteristics within the hypnotic state. The contradictory results depend to a great extent to the fact that too little attention has been paid to the effect of suggestions given under the hypnosis. The physiological measurements whichg one receive under hypnosis depend on the suggestions given. In this experiment this was clearly seen when comparing the physiological measures from the induction phase, which contain passive suggestions (relaxation phase) and low activation level, and suggestions of a later activation (suggestion phase) with the measures from driving under hypnosis. The physiological variables showed during the driving values as high an activation as whan driving awake. A certain activation could be seen already during the induction when passing from passive relaxation suggestions to the phase where the Ss received suggestions describing the state after awakening. The awakening from hypnosis, after the ordered three deep breaths, mostly caused evident reactions on the other physiological variables. An interesting finding, worth a closer examination, is the tendency to take longer time to awake after posthypnotic suggestions of negative character. The differences in the physiological variables between driving under the different conditions are coonfused and difficult to interpret, while there are more similar differences between driving as a whole, induction of hypnosis and sleep. Under the condition "Driving under increased tiredness" the organism is forced to compensate the increasing tiredness by a still more increasing arousal to manage the performance. The measures indicating this increasing arousal reach their maximum just before falling asleep which appeared to be very rapid. The posthypnotic suggestion about fallinig asleep after 5 minutes driving belongs to suggestions of type 2 which concerns effectuation that is a delay decided in times. The investigations that have been done on this type of suggestion discuss the often amazing certainty with which the S executes the suggested act at the decided time. In this case, there Is a delay of an average of 30% before the Ss fall asleep. This may be connected with the fact that at the time estimation a change in the relation subjective – objective time at tiredness

occurs. Considerable effects of the induced psychological states have been recorded on the capability variables as reaction time and driving off which were taken as indicators of the car-driving ability in simulator. A difference of more than 0.2 sec between the best and worst conditions, according to effort, must be regarded as remarkably large compared with, for instance, earlier investigations on the influence of tiredness on reaction time during driving in simulator. The number of drivings off the road was in the same way, six times larger under drunkenness than with the condition of maximum capability. In regard to both reaction time and the number of drivings off the road, the worst capability was found under the condition, Drunkenness, followed by Tiredness, Worry and Diffidence. Under three of the conditions the capability. These conditions were Self-confidence, Hypnosis and Alertness. An interesting result is the great importance that the level of confidence seems to have on capability. Unde the condition Self-confidence the best result was reached both in regard to reaction time and drivings off, while the result was considerably worse under the condition Diffidence. The difference between these two states was also clearly reflected on the subjective estimations and in the subjective descriptions. The measure variables regarding capability used in the experiment, reaction time and number of drivings off the road, show, as can be seen, a very close accordance. The method of using post-hypnotic suggestions to induce different levels of Alertness, Motivation, Self-confidence, different Emotions, Conceptions and so on is administratively simpler than arranging a certain experiment situation and hoping that the S will be influenced towards the wanted state. As the individual reactions in the same situations can vary very considerably, it is clear that this must be a more adequate method to elicit directly the wanted state. The disadvantage of picking out people susceptible to hypnosis for these experiments is decreased by the fact that this ability seems to be dependent upon so few other factors. Investigations in this area show that a group picked out after the criterion “Susceptibility to hypnosis” shows, for instance, the same spreading of personalities as any other group.

MEASUREMENTS OF HYPNOTICALLY INDUCED EMOTIONS (Uneståhl et al., 1972)

There have been mainly three ways of creating emotions. Most investigations are made in a laboratory where the conditions in the situations are manipulated in order to develop emotions. Another way is to let the Ss take part in different activities, often outside the laboratory, supposing that these activities would create the desired emotions. There is a large uncertainty in these mentioned techniques, as many irrelevant variables have an opportunity to influence.

A third way of creating emotions is using hypnosis. Levitt et al. (1964) mention some advantages with hypnotic techniques in the research about emotions.

1) Variations in emotional states can be induced quickly and be terminated under control. Control is also obtained over the durability.
2) Amnesia can be induced for experiences with anxiety.
3) Carefully constructed instructions can create relatively “pure” emotioned states. Other procedures usually arouse a mixing of many feelings, which complicates the correlations between changes in emotional states and psychological or biochemical variables.
4) The varitations in the emotional state can be prolonged or intensified. The intensity can be increased or diminished during the run of the experiment.
5) The procedure can be repeated in one and the same subject, which makes testing of the reproducibility possible.

Levitt (1964) made many experiments with hypnotically induced anxiety (measuring plasma hydrocortison etc.) and found that the results were better than with all other artificially created anxiety. True Stephenson (1951) controlled EEG during hypnotically induced

positive and negative emotions but found no differences compared with a control group. Black and Friedman (1968) found differences in pulse and blood pressure but not in plasmahydrocortison-level. This was valid for all Ss except one, who had a very remarkable increase. Black and Friedman claim that most Ss had a “cold” emotion, but that the induced emotion sometimes can be real enough to produce a change in plasmahydrocortison. Thus it seems as if hypnotically induced emotions are enough “real” to cause changes in such physiological measures as pulse, bloodpressure, respiration etc. but regarding changes in EEG o the methods for induction of the emotion can vary in complexibility and specificity of the suggestions. Erickson (1944) describes a method where he creates the emotion by a story with thousands of words fitting to every subject´s earlier experiences, while Gidon, Frank and Bull (1950) use a simple and unpersonal method, linkin the emotion to one single word, for instance fear. All variations between these two extremes can be seen. Another technique is to let the Ss reexperience some events in the past and then condition the aroused emotion to some neutral stimulus (Uneståhl et al., 1971 e; 1972 g). Barendregt and van Dam (1969) conditioned different emotions to tunes of different frequency and could also control the intensity of the emotions by varying the amplitude of the tune. In the same way Uneståhl (1974 c) varied the intensity by counting to ten and varied the type of emotion counting in different languages.

METHOD

Emotions to be investigated, were happiness, anger and fear. Two physiological indicators were chosen, catecholmines and bloodpressure. Eight highly susceptible subjects participated. They had to go through six emotional conditions (happiness, anger and fear, hypnotically and posthypnotically induced) in a randomized order and at last a seventh neutral condition, posthypnotically induced. Thus, the Ss had to come to the laboratory on seven different occasions. Before the experiment detailed instructions were given to the Ss regarding food, activities, which could affect the excretions of hormones. The emotions (one at every session) were created by description of three rather general situations. The Ss were permitted to connect the situation with some previous experience and they were also told to react with the desired emotion. The emotion was then separated from the situation and bound to a certain response. The Ss should write words from a word-book on pages where the lines were numbered. Writing words on certain lines should evoke the different emotions. The instruction was constructed so that the emotion should be released four times and total on one third on every page. The subjective ratings were made on the dimensions pleasant - unpleasant and relaxation – tension, but also by marking fitting adjectives on a cheque list. The ratings were made before and after the experiment, twice during the hypnotic programming and six times during the performance. The catecholamines were measured by urine-tests, taken after the performance, 70 – 85 minutes after a previous toiletvisit. Adrenaline and nor-adrenaline were measured separately by a two-set filter-technique, using a standard fluormeter. The analyses were made in the Karolinska Institutet, Stockholm.

RESULTS

The subjective ratings manifested clearly the evoked emotions. The changes were largest during the hypnotic imagination, whereupon a successive decrease in the intensity occurred for most of the Ss. Some Ss had, however, persistent scoring during all the ratings. Six of the eight Ss experienced all the emotions as real, while one S had feelings of “as if”. The other 3 Ss had both “real” and “as if” feelings. The separation of the emotion from the situation functioned for all the Ss. For three people, however, the emotion returned iin connection with the emotion on the “critical lines”. All Ss had amnesia not

only for the hypnotic induction and programming but also for the performance made during hypnosis. Besides, 3 Ss had amnesia for the ratiings made during the posthypnotic conditions, which indicates a spontaneous trance, with a rather long duration. Instructions had not been given regarding the speed of the performance but a slight spontaneous variation could b seen (Figure VIII:4).
Figure VIII:4 Number of written pages in different conditions (M).

Happiness-H	Happiness-PH	Anger-H	Anger-PH	Fear-H	Fear-PH	Control

The results from the physiological meas rements can be seen from tables VIII:8-11.
Table VIII:8 Comparisons between experiment conditions and control conditions regarding A- and NA-excretion. Randomization test for matched-pairs (the table shows probabilities).

Condition	A-excretion	NA-excretion
Happiness-H	0.14	0.00 sign.
Happiness-PH	0.17	0.02 sign.
Anger-H	0.73	0.00 sign.
Anger-PH	0.59	0.02 sign.
Fear-H	0.53	0.01 sign.
Fear-PH	0.02 sign.	0.00 sign.

Table VIII:9 Comparison between hypnosis and posthypnosis over all Ss and all emotions regarding A- and NA- excretion (Friedman two-way analysis of variance. The table shows x^2-values).

Condition	A-excretion	NA-excretion
Hypnosis	3.81	0.25
Posthypnosis	2.25	3.25

Table VIII:10 Comparisons between the experiment conditions and the control condition for each subject regarding A- resp. NA-excretion and systolic rep. diastolic blood pressure. Randomization test for matched-pairs (probabilities).

	Hormones		Blood Pressure	

S	A-excretion	NA-excretion	Systolic	Diastolic
1	0.02 sign.	0.06	0.02 sign.	0.02 sign.
2	0.03 sign.	0.09	0.02 sign.	0.02 sign.
3	0.03 sign.	0.11	0.03 sign.	0.02 sign.
4	0.13	0.02 sign.	0.02 sign.	0.02 sign.
5	0.05 sign.	0.02 sign.	0.02 sign.	0.16
6	0.02 sign.	0.02 sign.	0.02 sign.	0.02 sign.
7	0.20	0.05 sign.	0.20	0.66
8	0.06	0.02 sign.	0.02 sign.	0.02 sign.

Table VIII:II Comparisons between amount of excretion of A and NA for each subject (Wilcoxon matched-paris signed-ranks test).

Subjects	1	2	3	4	5	6	7	8
Diff.in A- Na-excretior.	Sign. 2%	Sign. 5%	-	Sign. 2%	Sign. 2%	Sign. 2%	Sign. 2%	Sign. 2%

DISCUSSION

Hypnosis was in the beginning induced by an ordinary extensive induction method but from the second session the induction was carried out only by a signal word. No differences in subjective ratings or bloodpressure can, however, be detected between a hypnotic state induced by a more extensive induction or by a signal word. According to Schachter and Singer (1962) a cognitive element is needed beside the physiological arousal, if an emotion shall arise. Only one of the two elements is not enough to create an emotion. In this experiment like in previous experiments (Uneståhl et al., 1971 e; 1972 g) the emotions were created through a special event but the emotion was then separated from the situation, and amnesia for the given PHS was induced. The Ss rated their feelings on several occasions, during the experiment but were also asked if they could identify the feelings more specifically. Three kinds of reactions could be detected:

a) The S began to think at the “hypnotic” situation spontaneously during the performance and could identify the emotion from this situation (s Ss).
b) The Ss experienced only the emotion but managed to bring the situation into consciousness in order to identify the emotion (1 subject).
c) The S experienced only the emotion and had difficulties in identifying the emotion (3 Ss).

Thus, there seemed to be difficulties in identifying an emotion without linking it to a special situation. This was valid for the specific emotions but not for separating the megative emotions from the positive ones where the Ss did not hesitate. Two Ss manifested a clear decrease in intensity of the PHS at all ecperiment conditions while one S showed no decrease at all. In the other Ss a decrease could be seen in one or more of the different

conditions. The diminished intensity appeared both in subjective ratings and in bloodpressure and the two measures manifested mostly the same tendencies. The results from the measurements of the catecholamines manifested a significanct decrease of NA-excretion in all experiment conditions compared with the control. Also the A-excretion manifested the same thing, a significant decrease in the experiment conditions compared with the control. A comparison between the different emotions shows no significant difference in A- and NA-excretion over all Ss. Every subject manifests, however, a specific pattern of excretion, regarding the proportions between A and NA, which was rather stable during all conditions in spite of differences in quantity. Compared with the catecholamines the bloodpressure manifested, on the other hand, results in the opposite direction. Seven of the eight Ss had a significantly higher systolic blood pressure during experiment conditions, while six of the eight Ss had a significant increase in the diastolic bloodpressure. There is no simple explanation available for the deviations in the opposite direction for the two physiological measures. One hypothesis could be that the hypnotic state in itself has an inhibitory effect on some physiological functions while other measures, like blood pressure, continue to be sensitive for the different emotions during hypnosis and posthypnosis. As earlier mentioned, Levi and Pathas do not see the catecholamines as indicators on part of the emotions. This component may have been inhibited by hypnosis. According to Patkai (1971) this component is probably the general activity. The external activity in this experiment has been on the same level in all conditions but the level of physiological activation may have been lowered during hypnosis and posthypnosis. Hypnosis is, for instance, accompanied by a limitation of the stimuli-field and a feeling of detachment which give the Ss less possibilities of reacting on external stimuli.

COMMENTS

The Investigations related in this chapter exemplify that area of research which is called instrumental hypnotic research. The Interest is here not concentrated on hypnosis or hypnotic phenomena, but hypnosis is used as a valuable tool for inducing and controlling experiment variales. The refered investigations have differed in their character. The effect of a special created state on various measures has been studied, but also the effect on a special task of various subjective states.

SUMMARY

1. In recent years hypnosis has been extensively used as an experimental tool to study different problems inside Psychology.
2. PHS of B-type can be of considerable value as they are suitable to use for creating such general states which non-hypnotic experimental procedures have difficulties to produce.
3. The four investigations related in this chapter exemplify both the effect of a special subjective state on different measures and the effect on a special task of various produced emotions, attitudes etc.
4. The refered investigations also cover measures succh as subjective experiences, performance tests and physiological measures.
5. The subjective ratings show clear and evident deviations in the direction of the suggested state in spite of amnesia for the PHS.

6. Some performance tests are considerbly influenced (RT) while other do not seem to be effected at all (physical work test).
7. The extension of RT in sleep deprivation experiments is mainly the result of some very long reaction times, while the skewness coefficient is only slightly larger during posthypnotic fatigue compared with “normal”.
8. Posthypnotically produced emotional states seem to have moore influence on certain physiological measures (blood pressure) compared with other (cathecollamines).
9. The method of using PHS in this respect is often administratively much more simple than other experimental procedures.
10. The disadvantage of picking out people susceptible to hypnosis is decreased by the fact that this ability is dependent on very few other fectors.

CHAPTER IX. SELF-HYPNOSIS

Self-hypnosis (SH) or autohypnosis has been used to a great extent in therapy, but almost nothing has been done in the research area. Serious research is conducted in heterohypnosis only. A thorough review of the hypnosis literature reveals that this is characteristic of the whole 20th centery, while in the 19th century there was more work done on SH and autosuggestion. The literature on SH with some few exceptions – is full of oversimplification and has a popularized, prescriptive nature. The lack of research might be due to various factors: the denial of the concept “selfhypnosis” on theoretical basis (analytical theories); the opinion that SH is too exclusive and that very few people can learn it; the opinion that research on heterohypnosis can readily be applied to SH. The only scientific studies found, are by John Ruch (1973), investigating self-induction and by Erika Fromm (1973), where she tried to find some phenomenological similarities and differences between SH and heterohypnosis. John Ruch measured the results of subjects beginning with SH without having any prior experience of hypnosis. It turned out that initial self-induction yielded hypnotic responsiveness scores fully eequivalent to those obtained with conventional induction procedures, whether based on objective scores or subjective ratings. Erica Fromm let 36 Ss go through two 90 minutes´hypnotic and self-hypnotic sessions respectively. For the poorly hypnotic Ss she found no phenomenological differences but findings for the group of better Ss were:

a) More idiosyncratic, primary process type, visual imagery in SH than in HH.
b) More ego divisions or splits in SH than in HH, the added disassociated part being the speaker.

c) Differences in other ego functions or in depth of trance were not unequivocal but rather in different directions for different Ss. A new study has now started to test if personality factors can account for these differences.

The lack of research does not prevent many opinions to exist about SH. Some authorities consider SH as a function of "real" hypnosis (HH), a function of the experiences and expectations which the Ss bring from heterohypnosis. Others seem to switch the argument and consider HH as a form of SH. Even if an outside hypnotizer gives the instructions, the subject does not function as an automaton since he is capable of converting the given suggestions and is able to take over the conductance whenever he wishes to do so. That a person cannot reach similar depth in SH as in HH seems to be a not unusual statement. One reason being, that since the subject is his own self-hypnotizer, he has to play both and active and a passive role at the same time. The retention of a certain degree of conscious control and activity should prevent the subject from reaching a greater depth. To find answers to this and many other questions, two studies have been carried out. (Uneståhl et al., 1974 e and f).

A STUDY IN SELF-HYPNOSIS I AND II.

METHOD

In the first study, 16 Ss, II females and 5 males, age 17-47, all naïve for SH and 5 also with no prior experiences of HH, were given a tape with hypnotic induction and programming of SH. The procedure for SH was repeated on the backside of the tape (waking listening). After three sessions, listening to the tape, the Ss were told to try SH themselves. After additional sessions with the months, 7 comprehensive questionnaires were answered. Experiments concerning time estimations, the induction procedure as a voluntary involuntary process and pain influence, were carried out. In the second study 13 Ss, who had an earlier experience with SH lasting from one month up to 6 yars, were included. After a few pretrials the main experiment was carried out at one session. The procedure is presented in relation to the results.

RESULTS

Depth of hypnosis

The Ss in the first study have described in the minutest details what happened when they tried SH for the first time. To summarize some had better success than they had expected, but most of the Ss had worse results than when they had been listening to the tape. After 5 SH whan they had approximately the same experience of SH and HH time wise, the Ss were asked to compare SH-HH. The result shows very small differences in most variables, with the exception that the Ss experience SH as somewhat more tedious and that they are more easily influenced by disturbing elements in the environment. Also the results from the second study (table IX:1) indicate that SH and HH do not differ in regard to the depth of hypnosis.

Table IX:1 Depth of hypnosis in SH compared with HH

Experience of SH	Deeper in HH	Same Depth	Deeper in SH
Up to 1 month	1	5	1
More than 1 month	0	5	1
Total	1	10	2

Regarding the question on the change of depth during SH, over half of the Ss have the experience that the depth has fluctuated from time to time.

Table [illegible] Ratings of self-hypnosis compared with heterohypnosis after 5–30 training sessions [illegible]

A. Percentages

a)

SH goes	1 much better	2 somewhat better	3 the same	4 somewhat worse	5 much worse
After training sessions 5	0	12	44	38	0
10	6	31	31	31	0
20	6	25	50	19	0
30	13	25	50	13	0

b)

SH takes	much shorter time	somewhat shorter time	the same time	somewhat longer time	much longer time
5	13	19	31	38	0
10	10	31	38	9	0
20	19	50	31	0	0
30	13	56	31	0	0

c)

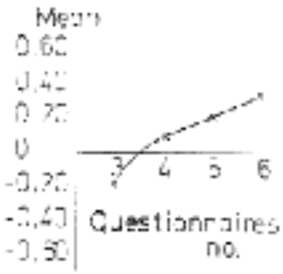
SH is	much less tedious	somewhat less tedious	the same	somewhat more tedious	much more tedious
5	0	18	19	50	13
10	6	19	25	44	6
20	13	25	31	25	0
30	13	9	31	38	0

d)

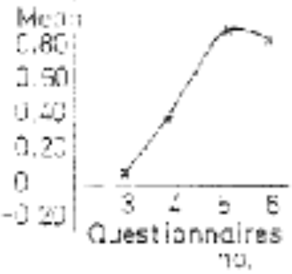
I am	much more detached	somewhat more detached	the same	somewhat less detached	much less detached
5	0	25	31	44	0
10	3	19	19	50	0
20	19	13	31	37	0
30	13	25	31	31	0

B. Change of group mean

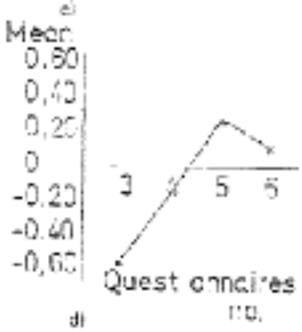
a)



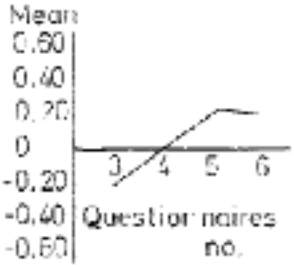
b)



c)



d)



a)

External factors disturbing me	much less	somewhat less	the same	somewhat more	much more
5	0	19	31	44	6
10	0	19	44	31	6
20	6	19	63	6	6
30	19	25	38	13	6

e)

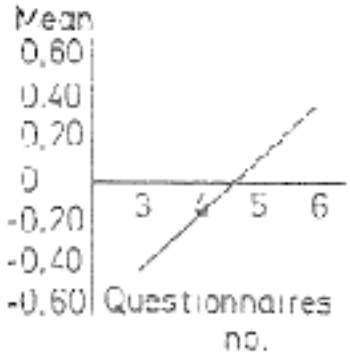


Table IX:3:II The extent of detachment in SH.

Trainingsessions	5	10	20	30
completely detached, do not notice anything in the environment	13%	19%	19%	13%
very detached, can register things, but without srvolvement	25%	25%	31%	44%
rather detached, but have almost always a certain awareness of the environment	50%	50%	50%	44%
can experience a certain detachment, but know all the time what happens in the environment	13%	6%	0%	0%
no detachment, always completely aware of the environment	0%	0%	0%	0%

Amnesia

In HH amnesia can be spontaneous or suggested. Even if the amnesia is spontaneous, it can be abolished by appropriate suggestions. An interesting question then arises: Is it possible to have amnesia a) suggested or b) spontaneous, after SH?

a) Suggested amnesia

To answer this question the Ss in the second study were instructed to enter SH and give themselves three different posthypnotic suggestions (written instructions), after which they should give suggestions about amnesia for the given PHS. The results can be seen in table.

Table IX:4 The effect of selfsuggested amnesia

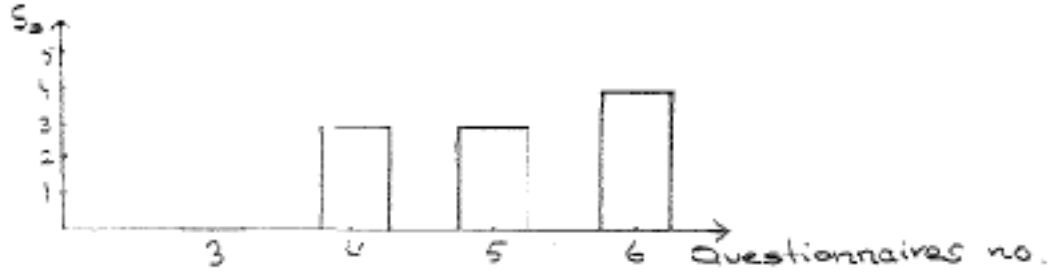
Experience of SH	Total Amnesia	Partial Amnesia	No Amnesia
0 – 1 month	2	2	3
1 month – 6 years	5	4	0
Total	7	6	3

Table 10:4 shows that all Ss with a longer experience of SH had either complete or partial amnesia. One interesting thing is that the amnesia entailed even those instructions given before entering SH. Those 3 Ss without amnesia reported certain difficulties in remembering the PHS.

b) Spontaneous amnesia

11 Ss in the second study reported that they always remembered the suggestions and PHS they had given themselves. The other 2 Ss reported that they had had on some occasions spontaneous amnesia both for the experiences under hypnosis and for the induction. In the first study the question was formulated: “Have you felt so completely detached during self-hypnosis that you can not afterwards remember which instruction you hav given yourself?” The percent of Ss answering yes can be seen from figure IX:2

Figure IX:2 Spontaneous amnesia in SH. Number of Ss



The question does not measure the frequency of amnesia but rather how many Ss experienced amnesia on one or another occasion.

The role of intention in SH-induction

The Ss learn to enter SH through a certain procedure. In the beginning they often modify the procedure to make it as sutiable for them as possible, but after a while the S always uses exactly the same technique from time to time. The question then arises as to what extent the process will be conditioned to the procedure? To investigate this question 16 Ss (in both studies) were told to try the procedure together with an active effort of preventing SH, to fight against entering SH. Ss submitted a detailed report of their experiences in this experiment. To summarize: 4 of 16 Ss could not prevent SH even if they tried. The process was so associated with the procedure so that it was impossible to separate them. One subject commented, that when the process started the will to fight against it also disappeared. Only two of 16 had no difficulties in preventing SH the other 10 Ss experienced varying degrees of resistance to fight off SH. It often created strong tension or conflict, and as long as this tension lasted they could resist SH. One S reported that he experienced the experiment so unpleasant that he had difficulties in continuing with SH for a while after the experiment Thus, the procedure alone seems to create the process with no intentional factors necessarily involved and with only limited voluntary possibilities to prevent the process.

Negative suggestions

Is it possible to get effect on self-induced negative suggestions? In the second study the Ss were told to enter SH and give themselves two PHS, first that a figure between 0 and 9 should be blocket, and secondly that they should feel toothache. Both PHS should be working during the 10 minutes after awakening. The results are shown in table IX:5 and table IX:6.

Table IX:5 The effect of PHS about blocking

Experience of hypnosis	Complete blocking	Partial blocking	No effect
0 – 1 month	3	4	0
1 month – 6 years	5	0	0
Total	8	4	0

Table IX:6 The effect of PHS about toothache

Experience of hypnosis	Strong toothache	Weak toothache	No effect
0 – 1 month	4	3	0
1 month – 6 years	0	4	1
Total	4	7	1

Blocking phenomena will be discussed in more details in the next chapter. Only in 1 of the 12 Ss the PHS about toothache effect was not manifested. This subject reported afterwards that he was scored I this suggestion, but that he still induced it. The purpose of this experiment was to see if it was possible to self-induce something unpleasant. However, the instructions did not say anything about the extent of the toothache, which

gave the Ss the possibility to induce it in a low degree. Only 4 Ss experienced it as clearly unpleasant.

The influence on pain

A special investigation was made of the Ss who had used SH in connection with pain, 7 Ss in the first study and of those 7 Ss, using PHS for pain removal, five esperienced complete loss of pain-sensation, while 2 experienced a decrement or no effect at all. On questioning when the pain returns; does it come at once or slowly, only one S experienced immediate pain return, while the other six subjects reported a gradual increase in pain sensation. In connection with this, the Ss were asked; how long did it take them from the beginning to feel pain until the pain reached full strength. One subject answered “some seconds to some minutes”, one “half an hour”, and 2 Ss “half an hour to one hour and a half”. 2 Ss reported that they never permitted the pain to reach its maximum threshold (severe chronic pain). 4 Ss had detected that the PHS were more effective if the PHS was related to a time decision for pain return. It brought also a feeling of security. Mostly it lasted for some hours, but one subject it once during 14 days with good result. Some questions were asked about what kind of pain was the easiest to influence. Of the suggested alternatives, the answers showed that localized pain was better than radiating, and constant better than fluctuating pain. 4 Ss were of the opinion that new pain was easier to reduce than an old one, but 2 Ss had better success with a familiar pain. One subject remarked that pain from smooth muscles was more difficult to reduce than skeletal muscles. The Ss had applied SH during mild pains, such as menstruation, headache, migraine, tooth extraction, but also during severe chronic pain and major operations (2 Ss received no other anesthesia).

SH and heterosuggestion

One very interesting question is to find out if some external person can influence a subject in SH, for instance, by giving suggestions (heterosuggestions). To investigate this, I used the following technique: When the subject had entered SH and was giving himself PHS about blocking, tooth ache and amnesia, I contacted him with the following words: “I want you to listen to me. When you wake up you will realize that figure no. 1 is abolished; you will realize that the figure no. 1 and its concept are completely gone. Now you can continue to instruct yourself”. The results are shown in table IX:7.

Table IX:7 Effect of heterosuggestion about blocking in SH

Experience in hypnosis	Complete blocking	Partial blocking	No effect
I	3	4	0
II	5	0	0
Total	8	4	0

The results were exactly the same as those of their own suggestion about blocking. All Ss, who had amnesia afterwards (table IX:4), had no recollection that I had talked to them and had given them a PHS.

Blocking of external influence

Another interesting question which is directly related to the previous ones is to investigate – if the Ss can block themselves for heterosuggestions and in this way can prevent any external person to take advantage of SH in giving them suggestions. A follow up was made of 7 Ss. The subject was told to enter SH and immediately give this suggestion: "From now on I will not be influenced by suggestions from anybody, except by those given to me by myself. "After a while I tried to contact him and talk to him in the some way as at the previous session. (I chose another number). The result was that none of the Ss showed any sign of blocking for the figure I had mentioned. The results in these studies are interesting and important as it is my firm belief that the use of SH in the coming few years will increase tremendously both in research, in clinical settings and in nonclinical settings like sports, art, and education. The resistance that some people feel for heterohypnosis, "hand over the control to somebody else" is not valid for SH, where the subject himself is both the subject and the hypnotizer. In the first study the Ss were asked if they used the word ´I´or ´you´in connection with selfsuggestions. 44% used I, 25% you and 31% used both. The comments of the subject´s preference in manner of addressing indicate that some personality factors like dominance – submissiveness may play a role. Erika Fromm (1972) has suggested that the two parts of the ego in HH (Listener and Observer) will in SH split inito three parts – Listener, Observer, and Speaker. This means a more active form of hypnosis, which in the beginning is experienced as rather unfamiliar and tedious but after a short training the same effect as HH is obtained. The first study shows that when one had mastered and begun to practice SH the motivation steadily increases since one continually discovers new application areas. It is an ability that most people have, an ability that they have had all their lives without using it.

The only help they need is to detect this ability.

This chapter ahs shown:

1) In spite of extensive clinical use, self-hypnosis (SH) is in research still a wide unexplored field.
2) SH, where the person is both subject and hypnotizer is experienced in the beginning as more tedious than HH.
3) The Ss can reach the same depth of hypnosis in SH as in HH.
4) After 30 training sessions with SH, the Ss rated SH as more positive than HH in all rating variables.
5) The Ss can induce posthypnotic amnesia for their own suggestions and for the whole SH.
6) It is possible to receive spontaneous amnesia also after SH.
7) It is difficult and for some Ss impossible to prevent actively entering SH if they follow the induction procedure.
8) It is possible to induce "negative" and undesirable suggestions.
9) After loss of pain sensation and a pain free period of some hours, a gradual return of the pain seems to be most common.
10) It is easier to influence a localized pain than a radiating one, and a constant pain is more easily influenced than a fluctuating pain.
11) During SH, the Ss are also susceptible for suggestions from external persons.
12) This susceptibility can be blocked so that no one else can give effective suggestions other than the subject himself.