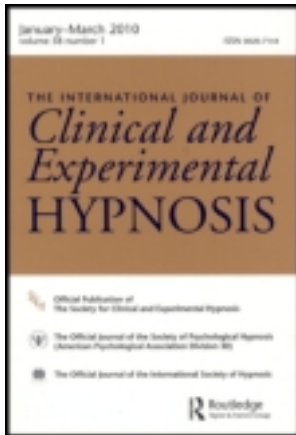


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The Effect of Posthypnotic Suggestion, Hypnotic Suggestibility, and Goal Intentions on Adherence to Medical Instructions

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THE EFFECT OF POSTHYPNOTIC SUGGESTION, HYPNOTIC SUGGESTIBILITY, AND GOAL INTENTIONS ON ADHERENCE TO MEDICAL INSTRUCTIONS

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Abstract: The effects of implementation intentions and posthypnotic suggestion were investigated in 2 studies. In Experiment 1, participants with high levels of hypnotic suggestibility were instructed to take placebo pills as part of an investigation of how to best enhance compliance with medical instruction. In Experiment 2, participants with high, medium, and low levels of hypnotic suggestibility were asked to run in place, take their pulse rate before, and send an e-mail report to the experimenter each day. Experiment 1 revealed enhanced adherence as a function of both implementation intentions and posthypnotic suggestion. Experiment 2 failed to find any significant main effects but found a significant interaction between suggestibility and the effects of posthypnotic suggestion. Posthypnotic suggestion enhanced adherence among high suggestible participants but lowered it among low suggestibles.

In medical contexts, compliance or adherence has been defined as "the extent to which a person's behavior coincides . . . with medical or health advice" (Haynes, 1979, pp. 2–3). Poor adherence to medical instructions and treatments increases hospitalization rates, workdays lost, and the number of drug-resistant strains of organisms. Compliance rates of 60% for pharmacological prescriptions (Ley, 1997) and less than

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50% for nonpharmacological treatments (Dunbar-Jacob, Burke, & Puczynski, 1995) have been reported, the latter diminishing further over time. Thus, increasing the rate of adherence to medical instruction is an important task. In the studies reported here, we evaluated the effectiveness of two strategies for enhancing compliance with medical instruction: the formation of implementation intentions and the administration of posthypnotic suggestion. Both interventions have been linked to automaticity in behavior (Gollwitzer, 1999; Kirsch & Lynn, 1999).

Gollwitzer (1999) distinguished between two types of intentions, goal intentions and implementation intentions. Goal intentions specify a particular end state (e.g., losing weight) or desired behavior (e.g., taking prescribed medication). Implementation intentions specify when and where a particular behavior will be performed (e.g., I will take my pill with my orange juice at breakfast each morning). The facilitative effect of implementation intentions on health-related behaviors has been demonstrated in a number of studies. Among the behaviors facilitated by implementation intentions are performing breast self-examinations (Orbell, Hodkins, & Sheeran, 1997), taking vitamins (Sheeran & Orbell, 1999), and participating in vigorous exercise (Milne, Orbell, & Sheeran, 2002).

Gollwitzer (1999) hypothesized that implementation intentions place the intended behavior under the control of the situational cues (time and place) designated in the intention, so that the response is performed automatically. The idea that these intentions automatize the behavior suggested to us the possibility that health behaviors might also be enhanced by the use of posthypnotic suggestion. Posthypnotic suggestion is a request made during hypnosis that a behavior be performed automatically after hypnosis has been terminated. As with implementation intentions, a cue that is to control the behavior is generally specified (e.g., you will touch your right ankle when I clap my hands, but you will not be aware of my having asked you to do this), and the emission of the response is reported as having been automatic by those hypnotized subjects who respond. The experience of automaticity has been identified as a hallmark of hypnotic responding and termed the classic suggestion effect (Kirsch & Lynn, 1999).

Barnier and McConkey (1998a, 1998b) reported two studies on the use of posthypnotic suggestion to facilitate the performance of a daily behavior (mailing postcards to the experimenter) by participants who had been screened for high levels of hypnotic suggestibility. In the first study, high suggestible participants given a posthypnotic suggestion mailed significantly fewer postcards than those given a simple social request. In the second study, posthypnotic suggestion did not differ significantly from social request. At first glance, these data seem to suggest that the effect of posthypnotic suggestion on medical compliance might be negative rather than positive. However, it is possible that the negative results reported by

Barnier and McConkey were a consequence of the particular posthypnotic suggestion they used. Their suggestion was a statement that the participant will enact the desired behavioral response. One reason for involuntary noncompliance with medical instruction is a failure of prospective memory. The person simply forgets to take the prescribed medication, to do a physical exercise, or to follow some other medical instruction. Indeed, Gollwitzer (1999) hypothesized that the formation of implementation intentions might improve prospective memory. With this in mind, we decided to test a different type of posthypnotic suggestion. Instead of telling participants that they would emit the requested behavior, we told them that the thought of emitting the response would come to mind without any effort at the appropriate moment. Thus, our suggestion was aimed at reducing involuntary noncompliance by helping participants remember to perform the intended action.

To summarize, the intent of these studies was to evaluate the separate and combined effects of (a) instructions to form implementation intentions and (b) posthypnotic suggestion on compliance with a medical instruction. Both studies used a 2×2 experimental design, in which participants were asked to form a goal intention or an implementation intention and either were or were not given a posthypnotic suggestion to remember to emit the intended behavior. Motivation was induced by describing the seriousness of the problem of nonadherence to participants and telling them that the study was designed to learn how health professionals might most effectively communicate instructions. In the first study, a pill-taking task was used with participants selected for high levels of hypnotic suggestibility.³ This was done to increase the likelihood of finding an effect of hypnosis if there was one. In the second study, an exercise task was used, and participants represented the full range of hypnotic suggestibility. This allowed us to test the hypothesis that the effect of hypnosis would be moderated by the participants' level of hypnotic suggestibility. To our knowledge, this is the first study assessing the effect of posthypnotic suggestion on compliance with medical instructions.

EXPERIMENT 1

Method

Participants. Sixty-eight students at the University of Rome, (37 female and 31 male) ranging in age from 18 to 25 years old, were

³Hypnotic suggestibility is sometimes referred to as *hypnotizability* or *hypnotic susceptibility*. Weitzenhoffer (1980), who was senior author of the scale conventionally considered the gold standard for measuring this construct, noted that what the scale measured was the effect of suggestion in a hypnotic context, rather than the effect of hypnosis. Hence, we use the more accurate term *hypnotic suggestibility*, rather than the more popular term *hypnotizability*.

selected for participation from a sample of 176 students who had scored between 8 and 12 on the Waterloo-Stanford Group Scale of Hypnotic Susceptibility, Form C (WSGC; Bowers, 1998). The WSGC is a group adaptation of the Stanford Hypnotic Susceptibility Scale: Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962). A standard eye-closure induction and 12 hypnotic suggestions are presented via audiotape, following which participants complete a response booklet in which they are asked to indicate whether or not an outside observer would have seen an overt response to each of the 12 hypnotic suggestions. Each suggestion is rated pass or fail, yielding total behavioral scores ranging from 0 to 12. Internal consistency has been reported as .80 in one sample and .81 in another (Bowers, 1993). A correlation with the individually administered SHSS:C indicates that this group adaptation is a valid measure of hypnotic response (Bowers, 1993).

Procedure. Participants were asked to take one placebo pill per day for a period of 3 weeks. To motivate them to do so, they were told that the purpose of the study was to learn the factors that influence people's ability to follow their doctor's instructions and that the results could have important implications for the way in which physicians prescribe medications. The experiment used a 2×2 (instruction by suggestion) factorial design, with two levels on each factor. Participants were randomly assigned to receive goal-intention instructions or implementation-intention instructions and to receive or not receive a posthypnotic suggestion. Participants in the goal-intention condition were simply asked to take one pill per day. Those in the implementation-intention condition were further asked to specify the exact place and time they would take the pill each day. In addition, half of the participants were given a posthypnotic suggestion indicating that the thought of taking the pill would come to mind without effort at the appropriate moment. The other half did not receive a posthypnotic suggestion. Wording of the suggestion varied depending on whether the participant was in the goal-intention or the implementation-intention condition. This was done so that the content of the suggestion would be as consistent as possible with the instruction that was given. In the goal-intention condition, the posthypnotic suggestion was:

Everyday during the next 3 weeks you will take one pill. Taking this pill is very important for you, and it will be easy for you to remember to take it. The thought of taking the pill will occur at the right time, and you will find yourself wanting to take the pill. This will occur automatically, without any effort on your part. The instructions to take the pill and the desire to do so will come to your mind easily, without any effort, and you will have no problems in following the instructions.

In the implementation-intention condition, the posthypnotic suggestion was:

Everyday during the next 3 weeks you will take one pill. Taking this pill is very important for you, and it will be easy to remember to take it. The thought of taking the pill will occur at [time chosen by the participant] in [location chosen by the participant]. Imagine that it is [chosen time] and that you are in [chosen location], and that in this place and at this time that you are imagining you are finding yourself wanting to take the pill. This will happen automatically, without any effort on your part. The instructions to take the pill and the desire to do so will come to your mind easily, without any effort, and you will have no problems in following the instructions.

At the end of the 3 weeks, participants were instructed to return all remaining pills. The number of pills returned allowed us to calculate the number not taken and constituted the primary dependent variable.

Results

The mean number of pills not taken in each experimental condition is presented in Table 1. A 2×2 (instruction by suggestion) analysis of variance (ANOVA) revealed significant main effects for both type of instruction and the use of suggestion, instruction: $F(1, 64) = 23.61, p < .001, \eta^2 = .27$; suggestion, $F(1, 64) = 30.84, p < .001, \eta^2 = .33$, and both are very large effects as conventionally classified (Cohen, 1988). Participants given specific instructions took more pills (i.e., brought back fewer pills) than those given general instructions, and participants given posthypnotic suggestions took more pills than those not given suggestions. The interaction was also significant, $F(1, 64) = 18.43, p < .001$, and the effect size was once again large, $\eta^2 = .22$. Post hoc Fisher Least Significant Differences (LSD) tests ($\alpha = .05$) revealed that participants in the control condition (i.e., general instructions with no posthypnotic suggestion) took fewer pills than those in the other three groups but failed to reveal any significant differences among the three treatment groups. Thus, both interventions were effective, but the combination of the two was not more effective than either one of them alone.

Table 1
Number of Pills Returned by Participants at the End of the Study

Suggestion	Intention	Mean	SD
No	Goal	2.16	1.17
	Implementation	0.40	0.63
Yes	Goal	0.27	0.59
	Implementation	0.16	0.50

Inspection of the means in Table 1 reveals a high degree of compliance in all four groups, in that 90% of the pills were consumed even in the control condition. For this reason, we thought it worthwhile to also examine the proportion of participants who complied fully with instructions by taking all 21 pills over the course of the 3-week period (as indicated by returning with empty pill containers). Rates of full compliance were 11% in the goal-intention/no-suggestion condition, 67% in the implementation-intention/no-suggestion condition, 80% in the goal-intention/suggestion condition, and 90% in the implementation-intention/suggestion condition. Tests of differences between proportions ($\alpha = .05$) indicated lower rates of full compliance in the goal-intention/no-suggestion condition than in any of the other groups.

Discussion

The results of this study indicate that both implementation instructions and posthypnotic suggestion significantly enhance pill-taking instructions among high suggestible participants. The effect of these procedures is substantial; the proportion of variance (η^2) accounted for by the full model in the ANOVA was .56. With neither implementation instructions nor hypnotic suggestion, only 11% of the participants were fully compliant. With both methods added, the rate of full compliance rose to 90%.

EXPERIMENT 2

In Experiment 1, we found that implementation intentions and posthypnotic suggestion enhanced adherence. Differences between these methods were not significant, and the combination of the two was not significantly different than the use of either alone. This, however, may have been due to a ceiling effect. The percent of pills taken ranged from 90% (among participants given goal-intention instructions without posthypnotic suggestion) to 99% (among participants given implementation-intention instructions with posthypnotic suggestion). Experiment 2 was designed to provide a more sensitive test of differences between implementation intentions alone, suggestion alone, and the two combined by increasing the difficulty of the task. In this study, we replaced the pill-taking task with instructions to engage in strenuous physical exercise, monitor pulse rates, and report the results to the experimenter.

A second reason for altering the task was to reduce the potential for dissembling. Participants might report greater compliance than actually exhibited behaviorally, and pill counts might only control this partially, as one could simply discard some or all of the pills. The task we used in Experiment 2 required participants to send an e-mail to the

experimenter each day. This provided a reliable behavioral measure of compliance. While the content of the e-mail might contain inaccurate information, the act of sending the e-mail is itself a form of adherence to instruction and cannot be feigned.

The participants in Experiment 1 had been selected for high levels of hypnotic suggestibility. This enhanced the likelihood of finding an effect of posthypnotic suggestion, but it reduced the generalizability of the results. In Experiment 2, equal numbers of high, medium, and low suggestibility participants were included. In addition to enhancing generalizability of the results, this change allows us to assess the relationship between hypnotic suggestibility and the effect of posthypnotic suggestion and implementation intentions on adherence to medical instructions.

Method

Participants. From a sample of 235 students who had completed the WSGC, 124 undergraduate students at Seton Hall University (64 female and 60 male), ranging in age from 17 to 26 years old, were selected for participation. Selection criteria were gender and suggestibility score; the aim being to include an approximately equal number of males and females and equal numbers of low, medium, and high suggestible participants. For the purpose of participant selection and assignment to condition, high suggestibility was operationalized as scores of 9 to 12 on the WSGC, medium suggestibility as scores of 5 to 8, and low suggestibility as scores from 0 to 4. The main study was completed by 38 high, 45 medium, and 41 low suggestible students who were randomly assigned, within suggestibility levels, to form implementation or goal intentions and to receive or to not receive hypnotic suggestions.

Procedure. The procedures for this study were identical to those in Experiment 1, except that the pill-taking task was replaced with an exercise and e-mail task. Participants were asked to run in place for 5 minutes each day for a 3-week period, to take their pulse rate before and after the exercise, and to send a daily e-mail report to the experimenter. They were also asked to send an e-mail if they did not complete the exercise and pulse-rate task. This provided two measures of task compliance: number of e-mails sent and reported number of days on which the exercise task was done.

Results

Self-reported task completion was highly correlated with behavioral adherence to the instruction to send e-mail messages ($r = .95, p < .001$). The mean e-mails sent and reported task completions in each experimental condition are presented in Table 2. These data were analyzed via hierarchical regressions, in which main effects of instruction,

Table 2
Number of E-mails Sent and Reported Task Completions

Suggestion Intention		E-mails Sent		Task Completions	
		Mean	SD	Mean	SD
No	Goal	8.63	1.20	9.75	1.26
	Implementation	8.71	1.22	9.10	1.28
Yes	Goal	8.65	1.22	9.39	1.28
	Implementation	8.13	1.24	9.10	1.30

suggestion, and suggestibility were entered first, followed by the interaction of instruction and suggestion with suggestibility (see Baron & Kenny, 1986, for an explanation of this data-analytic strategy). These analyses did not yield any significant main effects for instruction or suggestion but did reveal significant suggestion by suggestibility interactions on both the number of e-mails sent, $\beta = .71, p < .01$, and the number of reported task completions, $\beta = .60, p < .05$. As shown in Figures 1 and 2, posthypnotic suggestion enhanced adherence among high suggestible participants but hindered it among low suggestible participants.

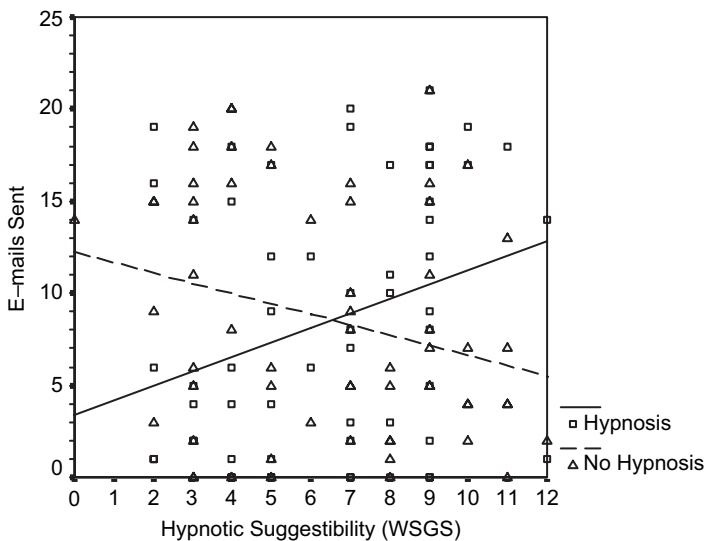


Figure 1. Number of e-mails sent as a function of hypnotic suggestibility and hypnotic suggestion.

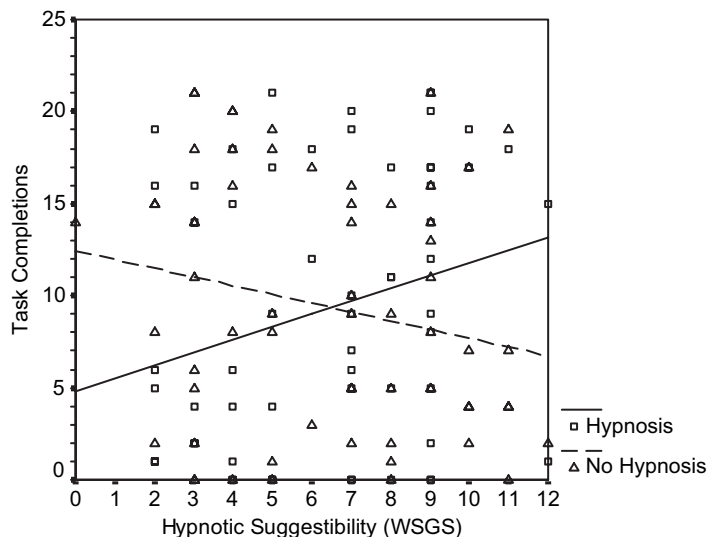


Figure 2. Number of reported task completions as a function of hypnotic suggestibility and hypnotic suggestion.

Discussion

In Experiment 2, we found that the effect of posthypnotic suggestion on adherence is moderated by suggestibility. Consistent with the results of Experiment 1, posthypnotic suggestion enhanced adherence with health-related instructions among high suggestible individuals. However, this benefit did not extend to low or medium suggestible people, and, in fact, the use of hypnosis significantly lowered compliance among low suggestibles. This lowering of compliance may have been a form of defiance, motivated by these participants' desire to demonstrate that hypnosis would not affect them. In contrast, high suggestibles might have been motivated toward greater compliance by the application of hypnotic procedures. Another possibility is that the posthypnotic suggestion led participants to rely on its effect to trigger the thought of the task, whereas without the suggestion they engaged in a more active effort to remember to do it. If so, then high suggestibles might have experienced enough of a suggestion effect to overcome the reduction in effort, whereas the behavior of lows, who are relatively unaffected by suggestion, would suffer from the absence of effort. With moderate levels of suggestibility, the suggestion effect might offset the decrease in effort, leading to no change in behavior.

Unlike the results of Experiment 1, we did not find a significant benefit for the formation of implementation intentions. These data are at

variance with those reported in prior studies (Milne et al., 2002; Orbell et al., 1997; Sheeran & Orbell, 1999). Experiment 2's inconsistency with the data reported by Milne et al. is particularly striking, as that study also involved requests for exercise. We note, however, that the dependent variable in that study was self-report. The significant effect of implementation intentions in the Milne et al. study may have been partially due to overreporting exercise compliance. In the present study, we also have a behavioral measure, in the form of daily e-mails sent to the experimenter, which may have constrained overreporting.

GENERAL DISCUSSION

Across these two experiments, we have obtained a consistent benefit for the use of posthypnotic suggestion to enhance adherence with health-related instructions among high suggestible individuals. Experiment 2, however, indicates that this benefit is limited to high suggestibles and that the effect of suggestion can be deleterious among low suggestibles. Theoretically, the finding of a significant effect linked to hypnotic suggestibility is generally taken as a sign that the effect is a true hypnotic effect. Practically, these data suggest that hypnotic suggestibility be assessed before using hypnotic suggestion to enhance adherence.

The psychological mechanism underlying this effect of posthypnotic suggestion on high suggestibles is worthy of further exploration, as it can have practical as well as theoretical implications. One possible mechanism is motivation, such that hypnosis motivates highs to demonstrate their hypnotic ability by intentionally complying with suggestion, whereas it motivates lows to demonstrate their lack of response by performing even less well than when not hypnotized (Spanos, 1986). Another possible mechanism is the facilitation of prospective memories by hypnotic suggestion. These are not contradictory hypotheses, and it is possible that both are at play. If this is the case, low and medium suggestible participants might benefit from a modification of the procedure, in which the suggestion is administered without the induction of hypnosis. Many studies have shown that hypnotic suggestions can be effective even when given without prior induction of hypnosis (Barber & Glass, 1962; Braffman & Kirsch, 1999; Hilgard & Tart, 1966; Hull, 1933; Weitzenhoffer & Sjöberg, 1961). These studies also indicate that some people are less responsive following a hypnotic induction than they are when the same suggestions are given without inducing hypnosis. Thus, investigation of the effects of nonhypnotic suggestions on compliance with health-related instructions might be a worthwhile follow-up to the present studies.

The effects of implementation intentions were inconsistent across our two studies. Formation of implementation intentions facilitated pill taking but not self-reported exercise or sending in exercise reports.

Unlike previous studies of the effect of implementation intentions on health behaviors, our study included a behavioral measure that could not be feigned. Thus, our data challenge the conclusion that the formation of implementation intentions can facilitate adherence with medical instruction. These effects may be due to another form of compliance, namely compliance with the demand characteristics of the experimental situation. Future studies on the effects of implementation intentions on health behaviors should include behavioral measures that are difficult to feign, and the possibility of simple compliance with demand should be investigated.

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Auswirkungen von posthypnotischer Suggestion, hypnotischer Suggestibilität und Zielintentionen auf die Adhärenz für medizinische Instruktionen

Claudia Carvalho, Giuliana Mazzoni, Irving Kirsch,
Maria Meo und Maura Santandrea

Zusammenfassung: Die Auswirkungen von Implementationsintentionen und posthypnotischen Suggestionen wurden in zwei Studien untersucht. In Experiment 1 wurden Teilnehmer mit hoher hypnotischer Suggestibilität instruiert, Placebopillen einzunehmen. Dies geschah im Rahmen einer Untersuchung, deren Ziel es war herauszufinden, wie die Kompliance mit medizinischen Anweisungen am besten sichergestellt werden kann. In Experiment 2 wurden Teilnehmer mit hohen, mittleren und geringen hypnotischen Suggestibilitätswerten gebeten, auf der Stelle zu laufen, zuvor ihren Puls zu messen und dem Experimentator täglich eine Email zu schicken. Experiment 1 erbrachte eine erhöhte Adhärenz als Funktion von sowohl Implementationsintentionen als auch posthypnotischen Suggestionen. In Experiment 2 hingegen zeigten sich keine signifikanten Haupteffekte, jedoch eine signifikante Interaktion zwischen Suggestibilität und den Effekten von posthypnotischer Suggestion. Posthypnotische Suggestion erhöhte die Adhärenz bei hochsuggestiblen Teilnehmern, verringerte sie aber bei Geringsuggestiblen.

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L'effet de la suggestion post-hypnotique, de la suggestibilité hypnotique et des intentions de conformité aux directives médicales

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Maria Meo, et Maura Santandrea

Résumé: Les effets des intentions de conformité aux directives et aux suggestions post-hypnotiques ont été étudiés dans deux recherches. Dans la

première expérience, des participants possédant un haut degré de suggestibilité à l'hypnose ont reçu la suggestion de prendre des placébos dans le cadre d'une investigation sur la façon de favoriser l'adhésion aux directives médicales. Dans la seconde expérience, on a demandé à des participants possédant des degrés de suggestibilité hypnotique haut, moyen ou bas, de courir sur place, de prendre leur pouls avant la « course » et d'en faire le rapport quotidien à leur expérimentateur. La première expérience a démontré une adhésion accrue résultant des intentions d'application et de la suggestion post-hypnotique. La seconde n'a révélé aucun effet principal significatif mais a démontré une interaction notable entre la suggestibilité et les effets de la suggestion post-hypnotique. La suggestion post-hypnotique a augmenté l'adhésion chez les participants hautement suggestibles, mais elle l'a diminué chez les sujets moins suggestibles.

JOHANNE REYNAULT
C. Tr. (STIBC)

El efecto de de la sugestión posthipnótica, la sugestionabilidad hipnótica, y las intenciones de meta sobre la adherencia a las instrucciones médicas

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Resumen: Investigamos los efectos de las intenciones de implementación y la sugestión posthipnótica en 2 estudios. En el experimento 1 pedimos a los participantes con niveles altos de sugestionabilidad hipnótica que tomaran pastillas placebo como parte de una investigación de cómo mejorar el cumplimiento con las instrucciones médicas. En el experimento 2 pedimos a los participantes con sugestionabilidad hipnótica alta, media, o baja que corrieran, tomaran su pulso antes, y enviaran un informe al experimentador todos los días. El experimento 1 mostró un incremento en la adherencia en función de las intenciones de implementación y la sugestión posthipnótica. El experimento 2 no mostró efectos principales significativos pero obtuvo una interacción significativa entre la sugestionabilidad y los efectos de la sugestión posthipnótica. Las sugestiones posthipnóticas aumentaron la adherencia entre los participantes muy hipnotizables pero la redujeron entre los poco sugestionables.

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