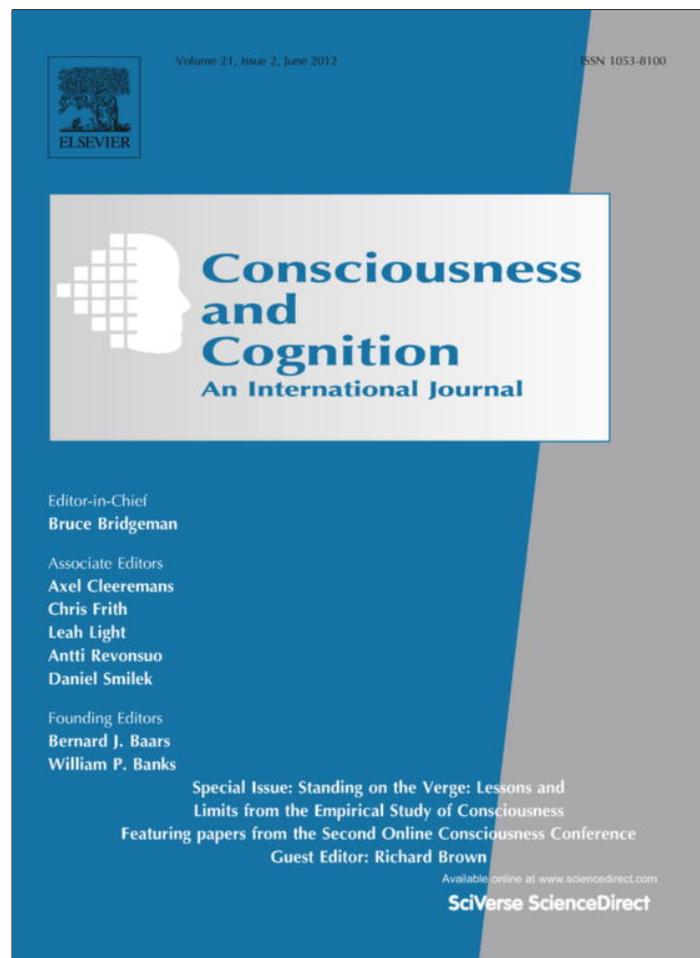


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Short Communication

## Furnishing hypnotic instructions with implementation intentions enhances hypnotic responsiveness

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### ABSTRACT

Forming implementation intentions has been consistently shown to be a powerful self-regulatory strategy. As the self-regulation of thoughts is important for the experience of involuntariness in the hypnotic context, investigating the effectiveness of implementation intentions on the suppression of thoughts was the focus of the present study. Participants were randomly assigned to one of four conditions (hypnotic instruction plus implementation intention, hypnotic instruction, implementation intention, and control condition). Results showed that participants who received information included in the “Carleton Skill Training Program” and in addition formed implementation intentions improved their hypnotic responsiveness as compared to all of the other three groups on measures of objective responding and involuntary responding. Thus, in line with the nonstate or cognitive social-psychological view of hypnosis stating that an individual’s hypnotic suggestibility is not dispositional but modifiable, our results suggest that hypnotic responsiveness can be heightened by furnishing hypnotic instructions with *ad hoc* implementation intentions.

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### 1. Introduction

What differentiates highly hypnotizable people from less hypnotizable individuals? In her review on brain dynamics associated with hypnosis, Crawford (1994) reports that highly hypnotizable persons have greater attentional abilities and thus are better able to focus and sustain their attention than low hypnotizable individuals. Highly hypnotizable participants are also reported to be more able to ignore distracting, irrelevant stimuli. On the other hand, training low hypnotizable subjects in direct management strategies (e.g., creating perceptual experiences) has been found to increase their hypnotic responsiveness, even up to the level of high-scoring participants (Gorassini, 2002).

The opposing results that hypnotizability is a stable ability, on the one hand, and that it can be modified, on the other hand, may be explained by different theoretical approaches. In fact, hypnotic theories have been traditionally dichotomized into two broad distinctive frameworks: the so-called state or special-process view (e.g., Bowers, 1992), and the nonstate or cognitive social-psychological view (see, for example, Spanos, 1986). Both perspectives have traditionally differed in their explanations of hypnotizability: while the state view considers hypnotizability as being a relatively stable personality trait, it has been claimed by nonstate theorists that given sufficient training, most people can become more hypnotizable. For example, Gorassini (2004) concludes in his review on the enhancement of hypnotizability that hypnotic responsiveness is highly modifiable and this may be achieved by a variety of techniques. Moreover, Kirsch and Lynn (1995) point out that

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the central issues dividing the field, such as whether hypnosis is an altered state of consciousness, can be best understood as points on a continuum.

### 1.1. *Inhibiting thoughts in the hypnotic context*

Attentional processes are major determinants of a person's hypnotizability (e.g., Kirsch & Lynn, 1998). In fact, the importance of attentional processes for the hypnotic experience has been highlighted both theoretically and empirically. As the hypnotic experience requires that attention be directed to the task at hand while alternate thoughts are ignored, thought suppression has been specifically pointed to as central to the hypnotic experience. For example, Barrios (2001) suggests, based on principles of conditioning and inhibition, that responsiveness may be increased by inhibiting stimuli and thoughts that are incompatible with the received suggestions. In a recent theoretical development, Dienes and Perner (2007) argue in their cold control theory of hypnosis that successful responses to hypnotic suggestions require effective executive control without the involvement of higher order thoughts about intending. The theory states that the hypnotic experience can be obtained by forming an intention to perform the cognitive activity or respective action (e.g., "Lift the arm!"). However, these hypnotic suggestions need to be implemented without the presence of the usually accompanying second-order thoughts about intending the action ("I am intending to lift my arm"). Consequently, highly suggestible people differ in this respect from low suggestible individuals insofar as the former are able to avoid second order thoughts about intending and dissociate them from actual intentions.

The assumption that self-regulating thoughts and behavior are relevant to the hypnotic suggestibility of a person has also been backed up empirically by Brown and colleagues (2001), who found that asking participants to avoid thinking and to not question what they were asked to do and experience, did indeed increase their suggestibility over and above standard procedures. Notably, Wegner and Erskine (2003) specifically examined whether people can suppress their thoughts of their intention to perform simple tasks while they carry them out. They found that people who received the instruction to suppress their thoughts about their intended behavior were able to influence their own experience of actions and consequently reported reduced intentionality (i.e., they experienced involuntariness for their actions). Wegner and Erskine observed, however, that thought suppression had no stable effect over time and can even produce a rebound effect of the suppressed thoughts. In fact, thought suppression has been repeatedly observed to produce paradoxical effects. In two studies, for example, Wegner and colleagues (1987) found that participants given the instruction to suppress their thoughts about a white bear reported thinking about the bear more than once per minute. These findings have also been replicated in the hypnotic context: Bryant and Wimalaweera (2006) found that low-suggestible participants showed higher accessibility of suppressed thoughts after the suppression period than did high hypnotizable participants. The latter participants, in contrast, did not display this ironic effect of thought suppression.

### 1.2. *Self-regulation by implementation intentions*

Taken together, these findings point to the importance of effectively inhibiting thoughts in the hypnotic context. One way of ensuring thought suppression without cognitive costs is by forming implementation intentions. Implementation intentions (Gollwitzer, 1999) are if-then plans that spell out when, where, and how a set goal is to be put into action: "If situation *x* is encountered, then I will perform response *y*!", thereby linking a critical situation with a goal-directed response. They are to be distinguished from goal intentions that merely specify a desired performance or outcome and have the format of: "I intend to reach *z*!" Goal intentions only designate desired end-states the individual wants to attain, while implementation intentions refer to the realization of the goal intention and create a commitment to respond to a specified critical situational cue in a planned, goal-directed manner. Implementation intentions are thus hierarchically subordinate to goal intentions; that is, they are formed in the service of attaining respective goal intentions. How do implementation intention effects come about? First, specifying the situational cue in the if-component of an implementation intention increases the cue's mental accessibility (e.g., Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2007). This allows for easy detection, effective recall, and a readiness to attend to the critical situation even if one is otherwise cognitively busy. Second, a strong cue-behavior link is established by making if-then plans (Webb & Sheeran, 2008), so that the presence of the specified cue automatically elicits the linked response. The upshot of these strong links is that the initiation of the goal-directed response specified in the if-then plan becomes automated; that is, it exhibits features of automaticity including immediacy, efficiency, and redundancy of conscious intent.

In sum, implementation intentions originate from an act of will creating an associative link between a critical situational cue and the respective goal-directed response. By forming implementation intentions, a person can thus switch from the conscious, top-down control of goal striving to an automatic, bottom-up control of goal-directed behavior (Gollwitzer, Parks-Stamm, & Oettingen, 2009). Though implementation intentions do originate from a conscious intent, the control of the goal-directed action is handed over to the specified critical situational cue (Gollwitzer & Schaal, 1998).

The assumption that implementation intention effects on goal attainment are vested in the switch from conscious and effortful goal striving to automated self-regulation of goal striving has been supported by findings showing that forming implementation intentions helps in dealing effectively with cognitive load (Brandstätter, Lengfelder, & Gollwitzer, 2001), does not heavily tax self-control resources (e.g., Schweiger Gallo & Gollwitzer, 2007), and circumvents the conscious intent to act at the critical moment (Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009; Sheeran, Webb, & Gollwitzer, 2005). Further,

beneficial effects of implementation intentions have also been shown for internal stimuli, such as the down-regulation of strong emotions (e.g., disgust, fear; Schweiger Gallo, Keil, Mc Culloch, Rockstroh, & Gollwitzer, 2009) and the shielding of a focal ongoing goal striving from disruptive inner states (e.g., moods, ego depletion, self-doubts; Bayer, Gollwitzer, & Achtziger, 2010). It is this latter research that supports our assumption that implementation intentions may also be effective in self-regulating thoughts in a hypnotic context.

## 2. The present research

In the present research, we tested whether furnishing hypnotic instructions with implementation intentions allows for particularly effective inhibition of higher-order thoughts, thereby increasing suggestibility as assessed by objective behavior and ratings of experienced involuntariness. As combined interventions of mental imagery and implementation intentions have been shown to lead to higher rates of goal achievement (Knäuper, Roseman, Johnson, & Krantz, 2009), we expected participants in the hypnotic instruction plus implementation intention condition to manifest the greatest increase in hypnotic responsiveness. Furthermore, based on previous research on implementation intention interventions which found that implementation intentions are stronger in people whose executive functions are impaired (for example, Gawrilow, Gollwitzer, & Oettingen, 2011a; Gawrilow, Gollwitzer, & Oettingen, 2011b; Gollwitzer & Gawrilow, 2008; Lengfelder & Gollwitzer, 2001), we hypothesized that low suggestible participants in the hypnotic instruction plus implementation intention condition would evidence an increase in hypnotic responsiveness that makes their performance equal to that of high suggestible control participants. This hypothesis is also backed by research showing that the Carleton Skills Training Program enhances hypnotizability especially among less responsive persons (Gorassini, 2004).

## 3. Method

### 3.1. Participants

One-hundred sixty-five participants were invited to participate in this study. The final sample at the second wave of data collection (henceforth called T2) consisted of 152 participants (103 women) aged between 18 and 56 ( $M = 23.42$ ,  $SD = 6.19$ ).

### 3.2. Procedure

Data collection took place at a German university at two measurement times. In both sessions, the standardized procedure included self-explanatory questionnaires and hypnotic induction instructions that had previously been taped by an experimenter who was trained in clinical hypnosis. Participants listened to the standardized instructions in groups of 3–12 participants.

Over the past decades, hypnotic experiments have included the assessment of both overt responses and subjective responses to standardized suggestions (e.g., Barber & Calverley, 1965). In order to assess objective responding, our participants first received the “Harvard Group Scale of Hypnotic Susceptibility” (HGSHS:A; Shor & Orne, 1962), which uses dichotomous items (i.e., respond vs. did not respond) to assess the participants’ overt behavioral responses on ideomotor, motor-challenge and cognitive-perceptual suggestions. This scale also served as the basis for the suggestibility classification (i.e., “low” vs. “high”). Following the procedure of a recent study by Barnes, Lynn, and Pekala (2009), we also included measures on experienced involuntariness by asking participants to indicate for each of the 12 suggestions from the HGSHS:A whether their responses were not at all involuntary, involuntary to a slight degree, involuntary to a moderate degree, or involuntary to a great degree.

In the second session (T2), which took place approximately two weeks later, participants were randomly assigned to one of four conditions (hypnotic instruction plus implementation intention, hypnotic instruction, implementation intention, and control condition) before re-administering the HGSHS:A. Participants in the hypnotic instruction condition were given information included in the “Carleton Skill Training Program” (CSTP; e.g., Gorassini & Spanos, 1999) to increase hypnotic responsiveness. We specifically followed Gorassini’s (2002) procedure by including information on the application of a direct management strategy to the hypnotic suggestions. The strategy instructions were slightly modified so as to accommodate the inclusion of highly suggestible participants: two statements indicating that the participant had previously achieved a low score on suggestibility were omitted.

As implementation intentions operate in the service of a respective superordinate goal intention (Sheeran et al., 2005), participants in the implementation intention condition were first asked to form the goal intention “I will suppress any thoughts about my intended behavior while performing the tasks!” and then add the if-then plan “And if I receive a new task, then I will tell myself: Suppress now any thoughts about my intended behavior!” Participants in the hypnotic instruction plus implementation intention condition received the hypnotic instruction and formed the goal intention plus if-then plan described above, while control participants performed two filler tasks (i.e., word search tasks). In these tasks, participants were asked to find as many countries (word search task 1) and trees and bushes (word search task 2) as possible. Following, objective responding and experienced involuntariness were assessed. The duration of the first session was approximately 70 min, while the second session took about 80 min.

Finally, we also assessed for both the implementation intention and the hypnotic instruction plus implementation intention conditions how committed participants felt towards the goal of suppressing their thoughts: “How committed to the goal did you feel?” and “How important was it for you to strive towards the goal?” We also assessed their perceived performance: “How aware of the goal were you during the hypnosis?” and “How arduous was it for you to strive towards the goal?” All of these items were accompanied by 7-point answer scales ranging from 1 (“not at all”) to 7 (“very”).

#### 4. Results

First, we divided participants on the basis of a median split of their objective responding score into low and high suggestible groups. Since the median was 7, those participants with a mean centrality rating of 8 and higher were identified as highly suggestible (see also for example, St. Jean, McInnis, Campbell-Mayne, & Swainson, 1994), the remaining 59% of the participants were classified as low suggestible. There were no significant differences between the variables of level of suggestibility,  $\chi^2(3, N = 152) = .82, p = .85$ .

##### 4.1. Objective responding

A one-factorial ANOVA on the difference score (T2–T1) was highly significant,  $F(3, 145) = 9.36, p < .01$ . More specifically, planned contrasts confirmed our assumption of a linear relationship between the four conditions: results showed significant differences between the control condition and the hypnotic instruction condition ( $M = -1.31, SD = 1.60$  vs.  $M = -.33, SD = 2.11$ ),  $t(145) = 2.13, p < .05$ , as well as between the control condition and the hypnotic instruction plus implementation intention condition ( $M = 1.03, SD = 2.25$ ),  $t(145) = 5.07, p < .01$ . Furthermore, significant differences were found between the implementation intention condition ( $M = -.72, SD = 1.86$ ) and the hypnotic instruction plus implementation intention condition,  $t(145) = 3.80, p < .01$ , as well as between the hypnotic instruction condition and the hypnotic instruction plus implementation intention condition,  $t(145) = 3.02, p < .01$ . All other comparisons (control condition vs. implementation intention condition, hypnotic instruction condition vs. implementation intention condition) were not significant,  $t_s < 1.3$ .

Looking at the highly suggestible participants only, a one-factorial ANOVA on the difference score (T2–T1) revealed no significant differences,  $F(3, 58) = 1.67, ns$ . This was not the case when we looked at low suggestible participants only (see Fig. 1),  $F(3, 83) = 10.56, p < .01$ . Here, significant differences were found between the control condition and the hypnotic instruction condition ( $M = -1.00, SD = 1.67$  vs.  $M = .65, SD = 1.75$ ),  $t(83) = 3.04, p < .01$ ; the control condition and the hypnotic instruction plus implementation intention condition ( $M = 1.92, SD = 1.95$ ),  $t(83) = 5.41, p < .01$ ; the implementation intention condition ( $M = -.05, SD = 1.60$ ) and the hypnotic instruction plus implementation intention conditions,  $t(83) = 3.74, p < .01$ ; and between the hypnotic instruction condition and the hypnotic instruction plus implementation intention condition,  $t(83) = 2.47, p < .05$ . All other comparisons (control condition vs. implementation intention condition, implementation

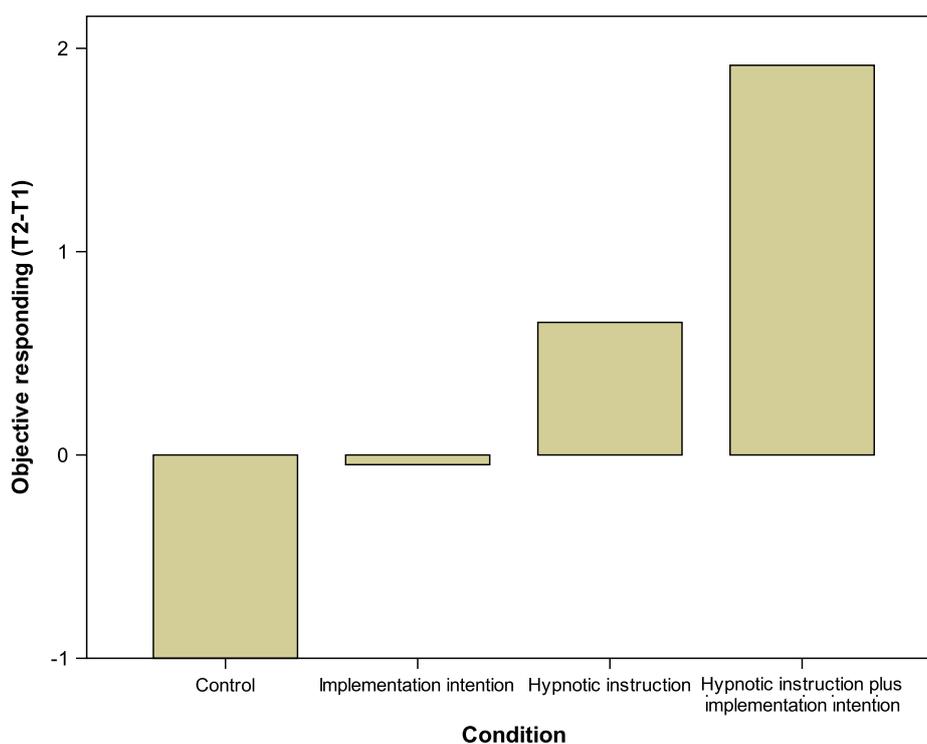


Fig. 1. Mean ratings of objective responding by condition in low suggestibles.

intention condition vs. hypnotic instruction condition) were only marginally significant or not significant at all,  $t_s < 1.7$ . Thus, furnishing the hypnotic instruction with an implementation intention was effective in producing the strongest objective responses. This attests to the effectiveness of the combined intervention, as compared to the mere implementation intention condition, the mere hypnotic instruction condition, and the control condition.

#### 4.2. Experienced involuntary responding

A one-factorial ANOVA on the difference score (T2–T1) was also highly significant for the experience of involuntary responding,  $F(3, 148) = 5.09$ ,  $p < .01$ . Again, planned contrasts confirmed our assumption of a linear relationship between the four conditions: results showed significant differences between the control condition and the hypnotic instruction plus implementation intention condition ( $M = -1.30$ ,  $SD = 5.22$  vs.  $M = 3.05$ ,  $SD = 5.62$ ),  $t(148) = 3.56$ ,  $p < .01$ ; between the implementation intention condition ( $M = -.76$ ,  $SD = 5.10$ ) and hypnotic instruction plus implementation intention condition,  $t(148) = 3.12$ ,  $p < .01$ , as well as between the hypnotic instruction condition ( $M = .45$ ,  $SD = 5.43$ ) and the hypnotic instruction plus implementation intention condition,  $t(148) = 2.15$ ,  $p < .05$ . All other comparisons (control condition vs. hypnotic instruction condition, control condition vs. implementation intention condition, hypnotic instruction condition vs. implementation intention condition) were not significant,  $t_s < 1.4$ .

Significant differences were not found when looking only at highly suggestible participants,  $F < 1$ . But as expected significant differences emerged when looking at low suggestible participants only (see Fig. 2),  $F(3, 85) = 5.14$ ,  $p < .01$ . Planned comparisons revealed significant differences between the control condition and the hypnotic instruction condition ( $M = -1.35$ ,  $SD = 5.69$  vs.  $M = 1.91$ ,  $SD = 4.44$ ),  $t(85) = 2.09$ ,  $p < .05$ ; between the control condition and the hypnotic instruction plus implementation intention condition ( $M = 4.36$ ,  $SD = 5.51$ ),  $t(85) = 3.73$ ,  $p < .01$ ; and between the implementation intention condition ( $M = .29$ ,  $SD = 4.67$ ) and the hypnotic instruction plus implementation intention condition,  $t(85) = 2.70$ ,  $p < .01$ . All other comparisons (control condition vs. implementation intention condition, hypnotic instruction condition vs. implementation intention condition, hypnotic instruction condition vs. hypnotic instruction plus implementation intention condition) were not significant,  $t_s < 1.7$ . In sum, the experience of involuntary responding was enhanced for participants in the hypnotic instruction plus implementation intention condition, as compared to the mere implementation intention condition, the mere hypnotic instruction condition, and the control condition. Apparently, furnishing hypnotic instructions with implementation intentions also heightens hypnotic responsiveness.

#### 4.3. Further analyses

##### 4.3.1. Reported goal commitment

In the post-experimental questionnaire, no significant difference in commitment to the goal of suppressing one's intention-related thoughts was observed neither in low suggestible participants in the hypnotic instruction plus implementation

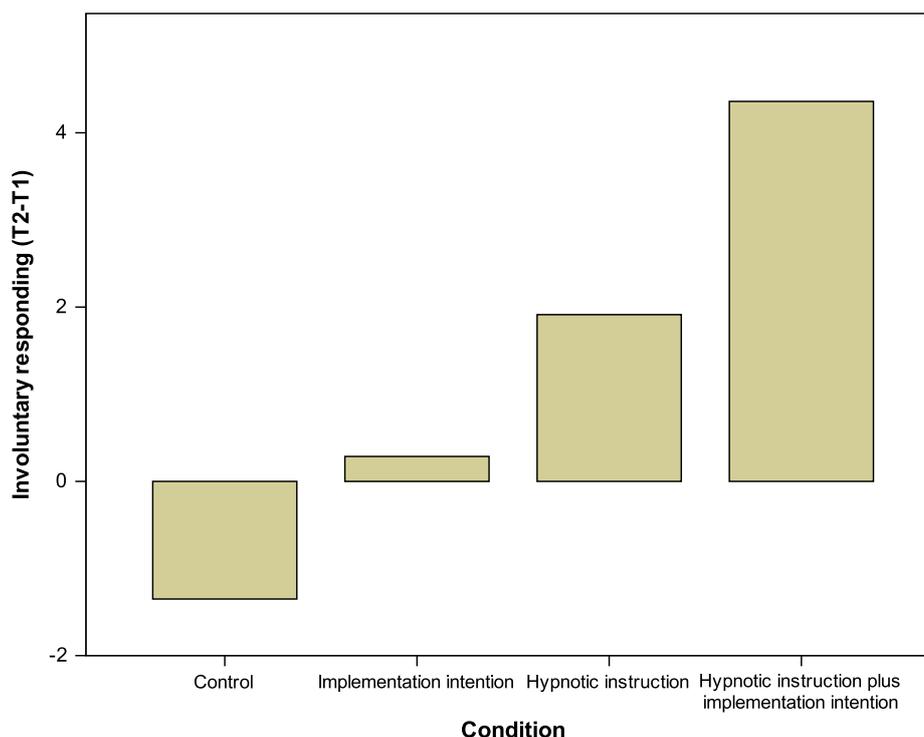


Fig. 2. Mean ratings of experienced involuntary responding by condition in low suggestibles.

intention condition ( $M = 5.36$ ,  $SD = 1.25$ ) vs. the mere implementation intention condition ( $M = 5.45$ ,  $SD = 1.05$ ),  $t < 1$ , nor in highly suggestible participants in the hypnotic instruction plus implementation intention condition ( $M = 5.00$ ,  $SD = 1.08$ ) vs. the mere implementation intention condition ( $M = 5.27$ ,  $SD = .96$ ),  $t < 1$ . The low suggestible participants in these two conditions likewise did not differ concerning the rated importance of striving towards the thought suppression goal ( $M = 5.40$ ,  $SD = 1.73$  vs.  $M = 5.50$ ,  $SD = 1.24$ ),  $t < 1$ ; again, the high suggestible participants in these conditions also did not differ with respect to rated importance ( $M = 5.23$ ,  $SD = 1.24$  vs.  $M = 5.40$ ,  $SD = 1.24$ ),  $t < 1$ . These findings suggest that the observed positive effect of furnishing the hypnotic instruction with an implementation intention have not been mediated by respective changes in commitment to the thought-suppression goal or the perceived importance of striving for this goal.

#### 4.3.2. Perceived performance

No significant difference concerning participants' reported awareness of the goal emerged in low suggestible participants in the hypnotic instruction plus implementation intention condition ( $M = 4.28$ ,  $SD = 1.95$ ) vs. the mere implementation intention condition ( $M = 4.60$ ,  $SD = 1.64$ ),  $t < 1$ , and in high suggestible participants in the hypnotic instruction plus implementation intention condition ( $M = 4.23$ ,  $SD = 1.48$ ) vs. the mere implementation intention condition ( $M = 4.13$ ,  $SD = 1.85$ ),  $t < 1$ . Regarding the arduousness of goal striving, responses did not differ significantly in low suggestible participants in the hypnotic instruction plus implementation intention condition ( $M = 4.48$ ,  $SD = 1.76$ ) vs. the implementation intention condition either ( $M = 4.40$ ,  $SD = 1.76$ ),  $t < 1$ ; the same was observed for high suggestible participants in the hypnotic instruction plus implementation intention condition ( $M = 3.92$ ,  $SD = 1.71$ ) vs. the implementation intention condition ( $M = 4.53$ ,  $SD = 2.00$ ),  $t < 1$ . These findings suggest that the observed differences between these two conditions with respect to our dependent variables have not been mediated by the awareness of the thought-suppression goal or the experienced arduousness of goal striving.

## 5. Discussion

Laurence, Beaulieu-Prévost, and du Chéné (2008) state that with respect to hypnosis research “there are a number of promising lines of inquiry: first, the focus on attentional processes and, more specifically, on the acquisition of automaticity” (p. 248). The present research takes up this suggestion by analyzing the effects of hypnotic instructions and forming implementation intentions – plans which lead to strategic automaticity (Schweiger Gallo et al., 2009) – on thought suppression in the hypnotic context. Based on previous research showing that the CSTP produces a significant increase in hypnotic responsiveness (for example, Gorassini, 2002), the present study sought to assess whether forming implementation intentions to suppress thoughts about the intended behavior either alone or in combination with a CSTP-based strategy produces a significant increase in hypnotic responsiveness. Results revealed that participants in the hypnotic instruction plus implementation intention condition improved their hypnotic responsiveness on measures of objective responding and experienced involuntary responding as compared to mere hypnotic instruction, mere implementation intention, and control condition participants. In fact, participants in the hypnotic instruction plus implementation intention condition performed more suggestions and reported a higher experienced involuntariness. Actually, the combined strategy was so effective that it made trained low suggestible participants indistinguishable from high suggestible participants.

Although one might be tempted to interpret the hypnotic instruction enhancing effects of implementation intentions in terms of compliance, the fact the instructions did not lead to an improvement in high hypnotizable participants seems to preclude this interpretation. In addition, by standardizing the experimenter's interactions with the participants, every effort was taken so as to reduce rapport. Finally, our observations that goal commitment, the importance of goal striving, the awareness of the goal and experienced arduousness of goal striving did not differ between conditions also suggest that it was not compliance, but rather strategic automaticity that caused the observed pattern of results.

The observation that the effectiveness of the hypnotic instruction was increased when adding implementation intentions is in line with previous research on the enhancement of goal attainment by implementation intentions (Gollwitzer & Sheeran, 2006). In fact, this study adds to previous research by pointing out how established procedures such as the CSTP may be turned into even more effective ones by adding implementation intentions. Also, implementations intentions are easily formed; their formation does not require any sophisticated knowledge or skills and thus they can be adopted *ad hoc*. Still, the quick and easy formed implementation intentions of the present study led to improvements of both objective performance and experienced involuntariness. This is quite astounding, as hypnotic sessions commonly take longer than 10 min, as it did in our study as well (see Gorassini, 2002).

Implementation intentions are observed to create automated self-regulation of goal striving (Gollwitzer & Oettingen, 2011). This automatic action control has also been referred as *strategic automaticity* or *instant habits*, as the implicated automatic processes are based on a single mental act of linking a critical situational cue with a desired goal-directed behavior, and thus are not the result of frequent past behavior or training as in the case of habits (Aarts & Dijksterhuis, 2000). One upshot of forming implementation intentions is that implementation intention effects are achieved without interfering with effortful cognitive processes and thus without entailing cognitive costs. Two lines of research back up this assumption: research on the suppression of urges by implementation intentions, and research on emotion regulation by implementation intentions. Specifically, data by Achtziger, Gollwitzer, and Sheeran (2008) support the assertion that implementation intentions are effective in warding off disruptive, urge-related thoughts. Further, Schweiger Gallo and Gollwitzer (2007) showed

that forming implementation intentions helped in controlling the fear of spiders, even when the pictures were evaluated under cognitive load.

We can infer from other research on implementation intentions that the produced changes in responsiveness as observed in the present study might be lasting over time: In a recent study, [Stadler, Oettingen, and Gollwitzer \(2010\)](#) tested the effect of a self-regulation intervention on eating more fruits and vegetables that started out with the goal setting strategy of mental contrasting that was then furnished with implementation intentions. Results revealed that two years after the intervention, participants in the information plus self-regulation group ate more fruits and vegetables than participants in the information group, who returned to their baseline level. In the hypnotic context, [Gorassini, Sowerby, Creighton, and Fry \(1991\)](#) were able to show that a brief cognitive skills training was effective in bringing about substantial immediate gains in objective suggestibility scores. More importantly, the training produced an enhancing effect even one year later.

Future research should therefore address the stability of the observed findings and analyze whether large gains in hypnotic responsiveness can be achieved over a longer period of time using combined instruction and implementation intention interventions. More research is also needed on the relation between thought suppression and hypnotic suggestibility. In a recent study by [Dienes et al. \(2009\)](#), no relation was found between hypnotic suggestibility and cognitive inhibition, as measured by a spatial negative priming task and latent inhibition task. Although we based our study on a different task paradigm, this issue deserves further attention.

### 5.1. Conclusions

In sum, the present research shows how, due to a quick and easy intervention based on implementation intentions in combination with a CSTP-based strategy, a significant increase in hypnotic responsiveness is achieved, as assessed by objective and subjective responding scores. The present research not only informs research on hypnosis, but also on motivation and self-regulation. Moreover, our findings might also be particularly valuable in clinical settings, where there has been an increased interest in hypnosis as a viable treatment of both acute and chronic pain problems ([Stoelb, Molton, Jensen, & Patterson, 2009](#)).

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### References

- Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: Automaticity in goal-directed behavior. *Journal of Personality and Social Psychology*, *78*, 53–63.
- Achtziger, A., Gollwitzer, P. M., & Sheeran, P. (2008). Implementation intentions and shielding goal striving from unwanted thoughts and feelings. *Personality and Social Psychology Bulletin*, *34*, 381–393. <http://dx.doi.org/10.1177/0146167207311201>.
- Barber, T. X., & Calverley, D. S. (1965). Empirical evidence for a theory of “hypnotic” behavior: The suggestibility-enhancing effects of motivational suggestions, relaxation–sleep suggestions, and suggestions that the S will be effectively “hypnotized”. *Journal of Personality*, *33*, 256–270. <http://dx.doi.org/10.1111/j.1467-6494.1965.tb01385.x>.
- Barnes, S. M., Lynn, S. J., & Pekala, R. J. (2009). Not all group hypnotic suggestibility scales are created equal: Individual differences in behavioral and subjective responses. *Consciousness and Cognition*, *18*, 255–265. <http://dx.doi.org/10.1016/j.concog.2008.07.006>.
- Barrios, A. A. (2001). A theory of hypnosis based on principles of conditioning and inhibition. *Contemporary Hypnosis*, *18*, 163–203. <http://dx.doi.org/10.1002/ch.230>.
- Bayer, U. C., Achtziger, A., Gollwitzer, P. M., & Moskowitz, G. (2009). Responding to subliminal cues: Do if-then plans cause action preparation and initiation without conscious intent? *Social Cognition*, *27*, 183–201. <http://dx.doi.org/10.1521/soco.2009.27.2.183>.
- Bayer, U. C., Gollwitzer, P. M., & Achtziger, A. (2010). Staying on track: Planned goal striving is protected from disruptive internal states. *Journal of Experimental Social Psychology*, *46*, 505–514. <http://dx.doi.org/10.1016/j.jesp.2010.01.002>.
- Bowers, K. S. (1992). Imagination and dissociation in hypnotic responding. *International Journal of Clinical and Experimental Hypnosis*, *40*, 253–275.
- Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology*, *81*, 946–960. <http://dx.doi.org/10.1037/0022-3514.81.5.946>.
- Brown, R. J., Antonova, E., Langley, A., & Oakley, D. A. (2001). The effects of absorption and reduced critical thought on suggestibility in an hypnotic context. *Contemporary Hypnosis*, *18*, 62–72. <http://dx.doi.org/10.1002/ch.220>.
- Bryant, R. A., & Wimalaweera, S. (2006). Enhancing thought suppression with hypnosis. *International Journal of Clinical and Experimental Hypnosis*, *54*, 488–499. <http://dx.doi.org/10.1080/00207140600857002>.
- Crawford, H. J. (1994). Brain dynamics and hypnosis: Attentional and disattentional processes. *International Journal of Clinical and Experimental Hypnosis*, *42*, 204–232. <http://dx.doi.org/10.1080/00207149408409352>.
- Dienes, Z., Brown, E., Hutton, S., Kirsch, I., Mazzoni, G., & Wright, D. B. (2009). Hypnotic suggestibility, cognitive inhibition, and dissociation. *Consciousness and Cognition*, *18*, 837–847. <http://dx.doi.org/10.1016/j.concog.2009.07.009>.
- Dienes, Z., & Perner, J. (2007). Executive control without conscious awareness: The cold control theory of hypnosis. In G. A. Jamieson (Ed.), *Hypnosis and conscious states: The cognitive neuroscience perspective* (pp. 293–314). New York: Oxford University Press.
- Gawrilow, C., & Gollwitzer, P. M. (2008). Implementation intentions facilitate response inhibition in children with ADHD. *Cognitive Therapy and Research*, *32*, 261–280. <http://dx.doi.org/10.1007/s10608-007-9150-1>.
- Gawrilow, C., Gollwitzer, P. M., & Oettingen, G. (2011a). If-then plans benefit delay of gratification performance in children with and without ADHD. *Cognitive Therapy and Research*, *35*, 442–455. <http://dx.doi.org/10.1007/s10608-010-9309-z>.
- Gawrilow, C., Gollwitzer, P. M., & Oettingen, G. (2011b). If-then plans benefit executive functions in children with ADHD. *Journal of Social and Clinical Psychology*, *30*, 616–646. [http://dx.doi.org/10.1521/jsocp.2011.30\(6\)](http://dx.doi.org/10.1521/jsocp.2011.30(6)).
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, *54*, 493–503. <http://dx.doi.org/10.1037/0003-066X.54.7.493>.

- Gollwitzer, P. M., & Oettingen, G. (2011). Planning promotes goal striving. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications* (2nd ed., pp. 162–185). New York, London: The Guilford Press.
- Gollwitzer, P. M., Parks-Stamm, E. J., & Oettingen, G. (2009). Living on the edge: Shifting between nonconscious and conscious goal pursuit. In E. Morsella, J. A. Bargh, & P. M. Gollwitzer (Eds.), *Oxford handbook of human action* (pp. 603–624). New York: Oxford University Press.
- Gollwitzer, P. M., & Schaal, B. (1998). Meta-cognition in action: The importance of implementation intentions. *Personality and Social Psychology Bulletin*, 24, 124–136.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, 38, 69–120. [http://dx.doi.org/10.1016/S0065-2601\(06\)38002](http://dx.doi.org/10.1016/S0065-2601(06)38002).
- Gorassini, D. R. (2002). Brief hypnotic suggestibility training: A confirmation of its effectiveness and a test of self-report validity. *Imagination, Cognition and Personality*, 22, 291–302.
- Gorassini, D. R. (2004). Enhancing hypnotizability. In M. Heap, R. J. Brown, & D. A. Oakley (Eds.), *The highly hypnotizable person: Theoretical, experimental and clinical issues* (pp. 213–239). London: Brunner-Routledge.
- Gorassini, D. R., Sowerby, D., Creighton, A., & Fry, G. (1991). Hypnotic suggestibility enhancement through brief cognitive skill training. *Journal of Personality and Social Psychology*, 61, 289–297.
- Gorassini, D. R., & Spanos, N. P. (1999). The Carleton skill training program for modifying hypnotic suggestibility: Original version and variations. In I. Kirsch, A. Capafons, E. Cardeña-Buelna, & S. Amigó (Eds.), *Clinical hypnosis and self-regulation: Cognitive-behavioral perspectives* (pp. 141–177). Washington: American Psychological Association.
- Kirsch, I., & Lynn, S. J. (1995). The altered state of hypnosis – Changes in the theoretical landscape. *American Psychologist*, 50, 846–858.
- Kirsch, I., & Lynn, S. J. (1998). Social-cognitive alternatives to dissociation theories of hypnotic involuntariness. *Review of General Psychology*, 2, 66–80.
- Knäuper, B., Roseman, M., Johnson, P. J., & Krantz, L. H. (2009). Using mental imagery to enhance the effectiveness of implementation intentions. *Current Psychology: Research & Reviews*, 28, 181–186. <http://dx.doi.org/10.1007/s12144-009-9055-0>.
- Laurence, J.-R., Beaulieu-Prévost, D., & du Chéné, T. (2008). Measuring and understanding individual differences in hypnotizability. In M. Nash & A. J. Barnier (Eds.), *The Oxford handbook of hypnosis* (pp. 225–253). Oxford: Oxford University Press.
- Lengfelder, A., & Gollwitzer, P. M. (2001). Reflective and reflexive action control in patients with frontal brain lesions. *Neuropsychology*, 15, 80–100.
- Parks-Stamm, E., Gollwitzer, P. M., & Oettingen, G. (2007). Action control by implementation intentions: Effective cue detection and efficient response initiation. *Social Cognition*, 25, 248–266. <http://dx.doi.org/10.1521/soco.2007.25.2.24>.
- Schweiger Gallo, I., & Gollwitzer, P. M. (2007). Implementation intentions: Control of fear despite cognitive load. *Psicothema*, 19, 280–285.
- Schweiger Gallo, I., Keil, A., Mc Culloch, K. C., Rockstroh, B., & Gollwitzer, P. M. (2009). Strategic automation of emotion regulation. *Journal of Personality and Social Psychology*, 96, 11–31. <http://dx.doi.org/10.1037/a0013460>.
- Sheeran, P., Webb, T. L., & Gollwitzer, P. M. (2005). The interplay between goal intentions and implementation intentions. *Personality and Social Psychology Bulletin*, 31, 87–98. <http://dx.doi.org/10.1177/0146167204271308>.
- Shor, R. E., & Orne, E. C. (1962). *Harvard group scale of hypnotic susceptibility, Form A*. Palo Alto, CA: Consulting Psychologists Press.
- Spanos, N. P. (1986). Hypnotic behavior: A social-psychological interpretation of amnesia, analgesia, and “trance logic”. *Behavioral and Brain Sciences*, 9, 449–502. <http://dx.doi.org/10.1017/S0140525X00046537>.
- Stadler, G., Oettingen, G., & Gollwitzer, P. M. (2010). Intervention effects of information and self-regulation on eating fruits and vegetables over two years. *Health Psychology*, 29, 274–283. <http://dx.doi.org/10.1037/a0018644>.
- St. Jean, R., McInnis, K., Campbell-Mayne, L., & Swainson, P. (1994). Hypnotic underestimation of time: The busy beaver hypothesis. *Journal of Abnormal Psychology*, 103, 565–569. <http://dx.doi.org/10.1037/0021-843X.103.3.565>.
- Stoelb, B. L., Molton, I. R., Jensen, M. P., & Patterson, D. R. (2009). The efficacy of hypnotic analgesia in adults: A review of the literature. *Contemporary Hypnosis. Special Issue: Hypnotic Analgesia*, 26, 24–39.
- Webb, T. L., & Sheeran, P. (2007). How do implementation intentions promote goal attainment? A test of component processes. *Journal of Experimental Social Psychology*, 43, 295–302. <http://dx.doi.org/10.1016/j.jesp.2006.02.001>.
- Webb, T. L., & Sheeran, P. (2008). Mechanisms of implementation intention effects: The role of goal intentions, self-efficacy, and accessibility of plan components. *British Journal of Social Psychology*, 47, 373–395. <http://dx.doi.org/10.1348/014466607X267010>.
- Wegner, D. M., & Erskine, J. A. K. (2003). Voluntary involuntariness: Thought suppression and the regulation of the experience of will. *Consciousness and Cognition*, 12, 684–694. [http://dx.doi.org/10.1016/S1053-8100\(03\)00054-0](http://dx.doi.org/10.1016/S1053-8100(03)00054-0).
- Wegner, D. M., Schneider, D. J., Carter, S., & White, T. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology*, 53, 5–13.