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THE 'HIDDEN OBSERVER' AND IDEOMOTOR RESPONDING: A REAL-SIMULATOR COMPARISON

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Abstract

Subjective reports of the amount of effort required to complete an ideomotor (i.e. arm suspension) task were contrasted across baseline, hypnosis, hidden observer and post-session trials among $N = 124$ participants who had previously scored in the high or low range on a standardized measure of hypnotizability. Low hypnotizable participants received simulation instructions prior to the experiment. Three different instructions were administered during the hidden observer trial. Participants were told that their hidden observer would be: more aware of the effort required to complete the task; or less aware; or they received no specific instruction concerning how their hidden observer report should differ from their previously generated hypnosis report. Results showed that the wording of the instructions influenced hidden observer ratings for both real and simulating participants. Copyright © 2005 British Society of Experimental & Clinical Hypnosis. Published by John Wiley & Sons, Ltd.

Key words: hidden observer, hypnosis, real-simulator

Introduction

According to Hilgard's (1973) neodissociation theory, multiple superordinate and subordinate cognitive and behavioural systems (Hilgard, 1977) responsible for individual behaviours, as well as mental processes such as pain perception and memory, are hierarchically arranged under a central control structure or 'executive ego'. In response to hypnotic suggestions, the 'executive ego' purportedly splits in two (Hilgard, 1986), creating a true division of consciousness that is maintained by an amnesic barrier that keeps the 'part' responsive to hypnotic suggestions separate from normal executive functions. Because hypnotic suggestions for ordinary movement such as bending one's arm are carried out by the dissociated part of the executive ego, hypnotized individuals experience their behaviour as nonvolitional and effortless.

Building on the early work of Sarbin (1950) and Barber (1969), who explained hypnotic behaviour and subjective reports through social, cognitive and interpersonal variables (e.g. beliefs, expectancies and the demand characteristics associated with the hypnosis session), Spanos's (1991) sociocognitive theory accounts for hypnotized participants' reports of nonvolition by the fact that individuals are often unaware of the actual cognitive processes that influence or determine their behavior (see Nisbett and Wilson, 1977). According to Spanos, hypnotized participants do not fully appreciate the impact of social and interpersonal variables on their behaviour, and they misattribute the 'cause' of their behaviour to hypnosis rather than to their own intentions. Accordingly, although hypnotized subjects retain full control over their actions, they often (mis)interpret their

goal-directed behaviours as involuntary occurrences (Spanos, Rivers and Ross, 1977; Spanos, 1986; Spanos, Salas, Bertrand and Johnson, 1989). For a recent review and comparison of dissociation theories of hypnosis, see Kirsch and Lynn (1995, 1998a, 1998b) and Kihlstrom (1998).

Hidden observer studies

Hilgard and his colleagues (Knox, Morgan and Hilgard, 1974; Hilgard, Morgan and Macdonald, 1975; Hilgard, 1977; Hilgard, Hilgard, Macdonald, Morgan and Johnson, 1978) argue that so-called 'hidden observer' studies demonstrate that multiple cognitive controls are operating during hypnosis. In the typical experimental paradigm, baseline measures of pain following exposure to a noxious stimulus (e.g. cold pressor pain where the hand is submerged in ice water; or ischemic pain produced by a tourniquet) are obtained at set intervals. Highly susceptible subjects are then hypnotized, given a suggestion for hand analgesia, re-exposed to the pain stimulus, and asked to report the intensity of their subjective pain. Before this next pain exposure trial, subjects are informed that the hypnotist is able to contact a 'hidden part' of their mind, a part that might be registering pain that the hypnotized part is not aware of. Further, subjects are told that the 'hypnotized part' is unaware of the 'hidden part'. Hilgard (1977) termed this 'hidden part' the 'hidden observer'. The hypnotist then 'contacts' the hidden observer (e.g. by placing a hand on the subject's shoulder), administers the pain stimulus one more time, and then obtains pain intensity reports. Typically, hidden observer reports of pain are more similar to baseline than they are to the reports obtained during hypnotic analgesia (for reviews, see Hilgard, 1979; Spanos, 1989).

Describing his subjects' hidden observer experience, Hilgard (1979) writes, 'They report discovering genuinely concealed or covert experiences, but these have turned out to be objective, matter-of-fact, scientific, accurate descriptions of contemporary events' (p. 70). Thus, according to Hilgard, the content of hidden observer reports is veridical and accurately reflects the ongoing monitoring, observing, and experiencing functions of the executive ego that have been temporarily dissociated from normal consciousness and are concealed behind an amnesic barrier. According to Hilgard's (1986) formulation, a division of consciousness spontaneously occurs not in response to the specific hidden observer instructions, but to the process of hypnosis and suggestions themselves (see Spanos, 1991).

Spanos (1986, 1991; Spanos and Coe, 1992) has been the most vocal critic of the hidden observer paradigm and neodissociation theory. In several studies, he and his colleagues demonstrated that the wording and explicitness of the hidden observer instructions directly affected the type of 'hidden' reports produced. In the first study, Spanos and Hewitt (1980) obtained reports of more or less 'hidden' pain as a function of whether subjects were told that their hidden parts would be either more aware or less aware of the actual amount of pain. In a follow-up study, Spanos, Gwynn and Stam (1983) administered hidden observer instructions without informing subjects about whether the pain experienced by the hidden part would be greater than, less than, or the same as that experienced by the hypnotized part. When given this 'low-cue' instructional set, subjects' overt and hidden pain reports were indistinguishable from one another. These same participants generated reports of more hidden pain and then subsequently less hidden pain when sequentially exposed to instructions calling for these patterns of hidden observer reports. Spanos and Coe (1992) concluded that the 'hidden observer phenomenon is a social construction shaped by the demands of the instructions to which subjects are exposed, rather than an intrinsic and unsuggested aspect of hypnotic responding' (p. 122).

Weitzenhoffer (1980) termed the transformation of a suggested idea into a behavioural enactment that is experienced as nonvolitional as the 'classical suggestion effect'. When hypnotized subjects, for example, are administered a suggestion for arm levitation, they often report that their arm 'moved all by itself'. Given the heated debate among hypnosis theorists regarding the meaning and implication of hidden observer studies, it is surprising that the hidden observer paradigm has not been used to investigate ideomotor suggestions (Kirsch and Lynn, 1995).

Using the hidden observer paradigm, the present study investigated subjective accounts of the amount of effort needed to maintain an outstretched arm across baseline, hypnosis, hidden observer and post-session trials among high and low hypnotizable participants. We varied the wording of the hidden observer instructions in order to investigate the influence of social demands on hidden observer responding. In one condition, we informed participants that the hidden observer would be more aware of the amount of effort needed to perform the task. In another condition, we told participants that the hidden observer would be less aware of the amount of effort needed to complete the arm suspension task. In a third condition, participants received no specific information regarding the nature of the hidden observer. In order to examine the experimental demands implicit in the hidden observer instructions, we instructed parallel groups of low hypnotizable participants to simulate the behaviour of an excellent hypnotic participant during the experiment. Simulators were instructed to use whatever they know about hypnosis and whatever cues they can glean from the experimental procedure to guide their behaviour. The inclusion of simulators serves as a control for experimental demands and cues inherent in the instructions. If the performance of high hypnotizables (reals) and low hypnotizables (simulators) is indistinguishable, then the behaviour in question may be the result of social demands.

If hidden observer reports reflect objective and accurate descriptions of experiences that are genuinely concealed during hypnosis, then hidden reports of the amount of effort needed to complete an ideomotor task will (a) be greater than what was reported during hypnosis and (b) resemble baseline reports. Moreover, the wording of the hidden observer instructions would not be expected to affect participants' reports. Sociocognitive theory, in contrast, predicts that the effort ratings will vary in a manner consistent with the wording of the hidden observer instructions.

Method

Participants

During the screening phase of this study, $N = 334$ undergraduate students completed the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A; Shor and Orne, 1962) ($M = 6.01$; $SD = 3.20$). Participants who passed nine or more suggestions were classified as 'high hypnotizable' while those passing four or fewer suggestions were classified as 'low hypnotizable'. Prior to the start of the experimental protocol, low hypnotizable participants received simulation instructions. High hypnotizable participants did not receive any special instructions prior to the administration of the experimental protocol. In order to be included in the final data sample, participants were required to meet the following criteria: (a) provide complete data during the administration of the experimental protocol; (b) pass the arm suspension task by stating that they were able to hold their arm up for 30-second trials across each of the four trials; (c) report that it took less effort to complete the arm suspension task during hypnosis than during the baseline trial; and (d) if a simulator, report that they successfully simulated

throughout the experiment and did not accidentally become hypnotized any time during the experiment.

A total of $N = 124$ participants ($n_{female} = 69$; $n_{male} = 55$) met the eligibility requirements of the study ($M_{age} = 20.47$; $SD = 5.58$). Final data analyses were based on the responses of $n = 59$ high hypnotizable and $n = 65$ low hypnotizable, simulating participants assigned to one of three experimental conditions (see below): More Aware (n =38); Less Aware ($n = 35$), and No Information/Control ($n = 51$).

Measures

The Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A)

The HGSHS:A (Shor and Orne, 1962) is a standardized,12-item, group administered, self-report measure of responsiveness to behavioural suggestions. This widely used scale correlates in the $r = 0.60$ range (Bentler and Roberts, 1963; Evans and Schmeidler, 1966) with the so-called 'gold standard' of hypnotic susceptibility, the individually administered Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer and Hilgard, 1962), and has adequate test-retest reliability properties ($r > 0.80$; Bowers, 1981).

Effort ratings and task verification

Following each of the four arm suspension trials (see below), participants reported the amount of effort it took to hold their arm up in the air by making a vertical slash mark on a 100 millimeter line with anchors of 0% ('absolutely no effort') and 100% ('extreme effort'). Participants also indicated ('yes'/'no') whether they were able to hold their arm out in front of them without dropping it 6 inches or more during the 30-second trial.[1]

Self-reported depth of hypnosis

At the end of the experiment, but prior to low hypnotizable participants identifying themselves as simulators, participants were asked, 'How hypnotized did you feel during today's session?' (anchors of 1 = *not at all*; 7 = *very deeply*).

Procedure

In the initial session, the HGSHS:A was administered via tape recorder in several large-group settings. Approximately one-week later, participants returned for a follow-up experiment.

Simulation instructions

Prior to the experiment, participants who passed four or fewer suggestions on the HGSHS:A met with an experimental assistant in a different room and received simulation instructions. These participants were instructed to fake or simulate the behaviour of a 'highly hypnotized' individual and to continue in this role from the moment they step into the experimental room until the very end of the study when the experimenter asks them to identify their status on the last page of the response booklet. Simulators were told to use their best judgment about how to mimic the behaviour of a highly hypnotized individual. They were told, 'Keep in mind that you will be faking the behaviour of an excellent, highly hypnotizable individual and that your task is to maintain that you are going into hypnosis, to perform during hypnosis, and, when you are awakened, to respond on questionnaires as if you had been in hypnosis'. To increase motivation among the simulators to try their best to mimic the behaviour of a highly

hypnotized person, they were told that if the hypnotist (or his assistant) suspected them of simulating, they would be tapped on the shoulder and asked to quietly leave the room. Simulators were told that as long as they continued in the experiment they were successfully fooling the experimenters into thinking that they were in fact highly hypnotizable participants.

Task description and baseline trial

At the beginning of the session, students were asked to participate in a short exercise before hypnosis. Here, the arm suspension task was described and proper arm positioning was demonstrated (i.e.'keep your arm straight out in front of you, palm down, with your elbow bent at an approximate 45 degree angle'). Participants were told that following each trial, they would indicate the amount of effort required to perform the task by marking a vertical slash mark on the scale printed in their response booklet. Reproducing the scale on a blackboard, the experimenter stated: 'In previous studies, we have found that this task typically requires some effort. To indicate a medium or middle amount of effort, you would make a vertical slash mark somewhere in the middle of the scale' (the experimenter marked the middle of the scale); 'To indicate less than a medium amount of effort, you would make your mark somewhere down in this region' (the experimenter pointed to the approximate 25% area of the scale); 'And to indicate more than a middle amount of effort, you would make your mark up here' (the experimenter pointed to the approximate 75% area of the scale).

Participants were then instructed to 'close their eyes and relax'. After a brief 10-second pause, participants were instructed to hold their non-dominant arm out in front of them as demonstrated earlier. After 30 seconds had elapsed, participants were told to lower their arm, open their eyes, and complete the post-trial questions in their response booklet. Following completion of the baseline trial, participants were informed that the arm suspension task would be repeated 'a couple more times' during hypnosis.

Hypnosis trial

The second trial began with the standard HGSHS:A induction. Following the induction, instructions for the 'hypnosis trial' of the arm suspension task were given. Participants were informed that because they were deeply hypnotized they would be able to complete the arm suspension task in an 'easy and effortless' way and that they would remain hypnotized while performing the task and while making the ratings. The experimenter stated that it wouldn't take 'nearly as much effort to hold your arm out in mid-air as it did when you were *not* hypnotized'. After the 30-second trial, on a separate page in their response booklet, participants completed the effort rating and answered the task verification question. After completing the hypnosis trial, participants were instructed to close their eyes and go 'deeper and deeper' into hypnosis.

Hidden-observer trial: More Aware (MA); Less Aware (LA); and No Information/Control (NIC) instructions

Introducing the hidden-observer-trial, the experimenter stated:

> In just a moment, you are going to hear a special sound like this: 'Ohm' [the experimenter vocalized the 'ohm' sound in a slow, deep, mantra-like voice]. The next time you hear this special sound, I am going to be able to contact a special part of your mind, a part of your mind that you are normally not consciously aware of. This special part of your mind is called your 'hidden observer'. It is 'hidden' because it is part of your mind that is not conscious and is only accessible during special times in hypnosis.

The remainder of the instructions varied as a function of MA, LA, or NIC conditions. In the MA condition, participants were told:

> Your hidden observer is actually more aware of how much effort is needed to complete the arm suspension task. Your hidden observer is more aware than the hypnotized part of your mind about how much effort is really needed to hold your arm up in the air. In just a moment, I am going to ask you to hold your non-writing arm out in front of you again. This time, however, your hidden observer will observe and later report how much effort it takes to complete the task.

In the LA condition, participants were told that their hidden observer was less aware of the amount of effort needed to complete the task. In the NIC condition, participants received the base information about the hidden observer and were told that their hidden observer would observe and later report on the amount of effort required to complete the task. Unlike the MA and LA instructions, no information was provided regarding how their hidden observer should differ from previous reports.

After administration of the hidden observer instructions, the experimenter repeated the 'ohm' sound and stated that he was now in contact with the hidden observer. Participants then completed the arm-suspension task and their 'hidden observers' completed the effort rating and the task verification question. Instructions were then given to end contact with the hidden observer.

Post-session trial

Following termination of hypnosis, participants were told that there was 'one last and final trial'. They were told that they were 'no longer hypnotized' and that they were in their 'normal state of wakefulness'. Participants then completed the final trial of the arm suspension task.

Self-reported depth of hypnosis and simulator verification

After completing the post-session trial, participants reported how hypnotized they felt during the experiment. The experiment was pronounced to be officially over. Before leaving the experimental room, on the final page of their response booklets (which was later scored by research assistants), participants disclosed whether they received simulation instructions prior to the experiment and, if so, whether they accidentally 'slipped' into hypnosis at any time during the experiment.

Results

Preliminary analyses

Hypnotizability scores

Across the three experimental conditions, high hypnotizable participants scored similarly on the HGSHS:A ($M_{\text{overall}} = 10.01$; $SD = 1.10$); F (2, 56) = 1.12. Likewise, average HGSHS:A scores ($M_{\text{overall}} = 1.72$; $SD = 1.35$) were comparable across conditions among low hypnotizable/simulating participants, $F(2, 62) = 0.27$.

Gender distribution

Chi-square tests on the proportion of male to female participants by experimental condition failed to reach significance among either high hypnotizable (X^2 (2, $n = 59$) = 0.85) or low hypnotizable participants (X^2(2, n = 65) = 0.19).

Gender differences

We initially examined our data for gender-related effects. None were found. For simplification purposes, we report the following analyses collapsed across gender.

Primary analyses

Effort ratings

Because the information presented to participants varied only during the hidden observer trial, we expected participants' ratings across baseline, hypnotic, and post-session trials not to differ as a function of condition. To test this hypothesis, we performed a repeated measures analysis of variance across the baseline, hypnosis, and post-session trials. The three different hidden observer instructions (our condition variable) and hypnotizability status (high/real vs. low/simulator) were used as between-subjects variables. High hypnotizable (reals) and low hypnotizable (simulators) participants' average effort ratings by condition and trial are listed in Table 1.

Between-subjects effects

As predicted, participants' ratings of effort during the baseline ($M_{\text{overall}} = 39.89$, $SD = 15.45$), hypnosis ($M_{\text{overall}} = 16.81$, $SD = 12.44$), and post-session ($M_{\text{overall}} = 49.09$, $SD = 18.44$) trials did not differ as a function of condition, $F(2, 118) = 0.88$. Differences between highs and simulators' ratings of effort across all three trials approached but did not reach significance, $F(1, 118) = 3.47$, $p = 0.06$.

Within-subjects effects (trial)

Because Mauchly's sphericity test was significant ($W = 0.87$, $p < 0.001$), degrees of freedom associated with the within-subjects effects were corrected by the Geisser-Greenhouse adjustment. The Condition X Trial X Hypnotizability and the Condition X Trial interaction failed to reach significance, F s < 1.45. A significant Hypnotizability X Trial interaction was found, $F(2, 117) = 4.53$, $p < 0.05$. Two orthogonal polynomial contrasts were performed. The results of the first contrast showed that simulators successfully mimicked the reports of high hypnotizable participants across the baseline ($M_{\text{simulators}} = 38.52$, $SD = 15.12$; $M_{\text{highs}} = 41.39$, $SD = 15.79$) and post-test trials ($M_{\text{simulators}} = 47.85$, $SD = 17.70$; $M_{\text{highs}} = 46.22$, $SD = 19.34$), $F(1, 118) = 1.45$. The second contrast compared ratings across both the baseline and post-test trials with those obtained during the hypnosis trial. Results showed that during the hypnosis trial, simulators ($M_{\text{hypnosis trial}} = 12.45$, $SD = 11.71$) exaggerated the amount of effortlessness reported by highs ($M_{\text{hypnosis trial}} = 21.61$; $SD = 11.50$), $F(1, 118) = 9.13$, $p < 0.005$.

A significant main effect for Trial was also found, $F(2, 117) = 197.35$, $p < 0.001$. Collapsing across all participants, ratings of effort were higher during the post-test trial ($M_{\text{overall}} = 47.09$, $SD = 18.44$) than during the baseline trial ($M_{\text{overall}} = 39.89$, $SD = 15.45$), $F(1, 118) = 18.61$, $p < .001$. And, as expected, across all participants, the ratings across both the baseline and post-test trials ($M_{\text{overall}} = 43.49$, $<SD = 16.95$) were higher than those obtained during the hypnosis trial ($M_{\text{overall}} = 16.81$, $SD = 12.44$), $F(2, 117) = 389.09$, $p < 0.001$.

Hidden observer reports

To investigate the potential effects of the hidden observer instructions on ratings of effort, difference scores (ratings obtained during the hidden observer trial minus those obtained during the hypnosis trial) were calculated for each participant. The Condition X

Table 1. Effort ratings across the four trials by condition and high (reals) and low (simulators) hypnotizability status

	Less Aware				No Information/Control				More Aware			
	Reals		Simulators		Reals		Simulators		Reals		Simulators	
Trial	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Baseline	44.89	(14.81)	41.41	(18.13)	39.09	(17.04)	40.64	(14.77)	40.83	(15.34)	33.10	(11.80)
Hypnosis	24.28	(10.33)	10.65	(11.79)	20.30	(12.31)	12.54	(9.77)	20.61	(11.72)	13.85	(14.27)
Hidden observer	27.78	(23.38)	9.71	(14.36)	26.96	(20.56)	17.07	(18.03)	34.67	(21.83)	43.45	(26.46)
Post-session	51.75	(17.96)	45.54	(17.79)	42.91	(18.18)	52.57	(16.94)	44.93	(21.84)	43.28	(17.94)

Hypnotizability interaction and the main effect for hypnotizability were not significant, Fs < 2.39.[2] A significant effect for condition was obtained, $F(2, 118) = 9.20$, $p < 0.001$. Scheffe post-tests revealed that, across both reals and simulators, the MA instructions led to higher effort ratings ($M = 22.24$, $SD = 27.60$) than both the LA ($M = 1.34$, $SD = 19.27$) and the NIC conditions ($M = 5.49$, $SD = 19.36$), both ps < 0.01. Mean ratings between LA and NIC participants did not differ from one another. The proportion of variance in difference scores explained by condition was Eta2 = 0.14.

We also tested whether the mean difference scores significantly differed from zero. The MA and the NIC instructions resulted in difference scores significantly greater than zero, $ts > 2.03$, $ps < 0.05$.[3] The average difference score among LA participants was not significantly different from zero, $t(34) = 0.41$.

Finally, we contrasted hidden observer ratings with baseline reports. The difference scores obtained by subtracting baseline ratings from hidden observer ratings significantly differed from zero among LA ($M = –24.20$, $SD = 26.06$) and NIC ($M = –18.41$, $SD = 25.65$) participants, both ts < - 5.12, both ps < 0.01. The difference between hidden reports and baseline ratings did not differ from zero among MA ($M = 2.53$, $SD = 26.50$) participants,$t(37) = 0.59$.

Non-parametric analyses

We also examined the frequency of reports of greater or lesser effort during the hidden observer trial relative to the hypnosis trial across conditions (see Table 2). A 2 (real/simulator) x 3 (condition) x 2 (rating direction: greater or lesser effort reported during the hidden observer trial relative to the hypnosis trial) multiway frequency analysis (MFA) was performed.[4] Results showed that the data could be adequately explained by a model containing the Condition x Rating Direction (CxR) interaction. The CxR loglinear model had a likelihood ratio $X^2(6, n = 115) = 2.37$, $p = 0.88$, indicating a good fit between observed and expected cell frequencies. Inspection of the standardized residuals proved acceptable. As can be seen in Table 3, condition and rating direction were significantly related regardless of whether marginal or partial tests of association were used.[5]

Table 2. Frequency of hidden observer reports of greater or less effort relative to the hypnosis trial

		Reported effort during the hidden observer trial	
Hypnotizability status	Condition	Less than hypnosis trial	Greater than hypnosis trial
Reals	Less Aware	12 *(70.6)*	5 *(29.4)*
	No Information/Control	10 *(45.5)*	12 *(54.5)*
	More Aware	7 *(38.9)*	11 *(61.1)*
Simulators	Less Aware	10 *(71.4)*	4 *(28.6)*
	No Information/Control	9 *(36.0)*	16 *(64.0)*
	More Aware	4 *(21.1)*	15 *(78.9)*
All participants	Less Aware	22 *(71.0)*	9 *(29.0)*
	No Information/Control	19 *(40.4)*	28 *(59.6)*
	More Aware	11 *(29.7)*	26 *(70.3)*

Note: Row percentages are listed in italics. Frequency data based on an $n = 115$.

Table 3. Summary of screening tests for multiway frequency analysis

Effect	df	G^2	*p*	G^2	*p*
All (total)	11	19.36	0.05		
Hypnosis status (H)	1	0.01	0.93		
Condition (C)	2	3.38	0.18		
Rating direction (R)	1	1.05	0.30		
		(partial)		(marginal)	
H x C	2	0.18	0.91	0.50	0.78
H x R	1	1.14	0.28	1.46	0.23
C x R	2	12.24	0.01	12.56	0.01
H x C x R	2	0.71	0.70		
Sums	*11*	*18.71*		*18.96*	

Note: Partial statistics are adjusted for third variable associations. Marginal statistics are equivalent to a two-way Chi-square test, collapsing over the third variable.

The odds of reporting greater effort during the hidden observer trial, relative to the hypnosis trial, were $O_{\text{conditional}} = 0.41$, 1.47, and 2.36 across the LA, NIC, and MA conditions. Odds ratios showed the following: (a) the odds of reporting greater effort during the hidden observer trial were nearly 6 times higher in the MA condition than in the LA condition ($O_{\text{ratio}} = 2.36 / 0.41 = 5.76$); (b) the odds of reporting greater effort during the hidden observer trial were approximately one and a half times greater in the MA condition than in the NIC condition ($O_{\text{ratio}} = 1.61$); and, (c) the odds of reporting greater effort were approximately three and a half times higher in the NIC condition than in the LA condition ($O_{\text{ratio}} = 3.59$).

Self-reported depth of hypnosis

Participants' reports of how deeply hypnotized they were during the experiment did not differ as a function of condition among either the high hypnotizable or simulating groups, both *F*s < 1.94. Across all conditions, low hypnotizable participants while still simulating ($M_{\text{overall}} = 5.90$, $SD = 1.59$) reported being more deeply hypnotized than reals ($M_{\text{overall}} = 4.56$, $SD = 1.28$), $F(1, 89)=19.86$, $p < 0.001$.

Discussion

Reports of the amount of effort required to complete an arm suspension task paralleled the information provided to participants concerning the nature of their hidden observers. That is, when participants were told that their hidden observer would be more aware of the amount of effort required to complete the task, their 'hidden observers' rated the task as more effortful compared to participants who were told that their hidden observers would be less aware of the amount of effort needed to complete the task. Furthermore, hidden observer ratings of effort were higher among MA participants than those who were given generic hidden observer instructions without any explicit information as to how their hidden reports should differ from their previously generated hypnotized reports. While ratings from LA participants were lower than those in the NIC condition, this difference failed to reach statistical significance.

We found that across the MA and NIC conditions, hidden observer ratings of effort were significantly higher than ratings obtained during the hypnosis trial. The fact that our control participants reported increased effort during the hidden observer trial is quite interesting. Participants apparently interpreted the hidden observer trial itself as an implicit request to monitor more carefully the amount of effort required to complete the task. Given how the hidden observer is introduced (i.e. the hypnotist is in contact with 'a special part of your mind,' a part that is 'not conscious' and is 'only accessible during special times in hypnosis') and the fact that the hidden observer trial followed the hypnosis trial, participants likely interpreted the introduction of a hidden observer as an experimental demand to generate ratings of effort that are somehow different from those reported during the hypnosis trial. Given the prior hypnotic suggestion that they experience less effort during the arm suspension task, the introduction of a novel and ambiguous hidden observer trial appears to have been interpreted as a suggestion for increased awareness relative to the hypnosis trial. If our conjecture is correct, then reports of increased awareness during hidden observer trials relative to hypnosis trials might at least partially be explained in terms of the experimental demands of the hidden observer paradigm itself. We should point out that while effort ratings increased during our generic hidden observer instructions, the magnitude of this increase was less than that reported by our MA participants, and was significantly lower than baseline reports. MA instructions, in contrast, resulted in effort ratings that were indistinguishable from baseline.

If the default expectation is to increase awareness during a 'low cue' or 'no-cue' hidden observer trial, then this could explain why our LA instructions failed to move hidden reports in a negative direction. More specifically, our LA instructions may have been counter to the demands of the hidden observer trial itself. While the effort ratings obtained during the hidden observer trial were not lower than those reported during the hypnosis trial, the LA instructions did prevent a significant increase in ratings, perhaps by countering the implicit demand to increase ratings of effort during the hidden observer trial. Indeed, among our LA participants, the difference between their hidden observer and hypnosis trial ratings did not statistically differ from zero. Furthermore, when we examined the data non-parametrically, participants in our LA condition were more likely to have a hidden report of *less* effort, relative to their hypnosis report, than were participants in either the MA or the NIC conditions.

Indeed, findings from the non-parametric analyses help us flesh out the impact of our instructions on reports of effort. Results from the MFA showed that the MA instructions led to a greater frequency of participants (70%) reporting increased effort during the hidden observer trial relative to the hypnosis trial, compared to those in the LA condition (29%). MA instructions also produced a higher frequency of reported increased effort than did the NIC (60%) instructions, although this difference did not reach significance. Finally, as noted above, the LA condition resulted in fewer reports of increased effort relative to the NIC instructions. The odds of reporting increased effort on the hidden observer trial relative to the hypnosis trial were nearly six times (i.e. 5.7) higher for MA participants than LA participants; 1.6 times greater in the MA condition than the NIC condition; and 3.6 times greater for NIC participants than the odds for LA participants. The inclusion of non-parametric analyses are important because they show that while the average ratings of our LA participants failed to decrease during the hidden observer trial relative to the hypnosis trial, nearly 70% of both real and simulating participants in the LA condition reported less effort during the hidden observer trial relative to the hypnosis trial.

Even though a majority of our LA participants reported less effort, the magnitude of the difference between their hypnosis and hidden observer reports failed to differ signifi-

cantly from zero. The apparent inconsistency between the non-parametric and parametric findings might reflect a floor effect on our rating scale. The average rating across all participants during the hypnosis trial was $M = 16.08$. Perhaps our scale, anchored at 0 and 100, inadvertently discouraged our LA participants from reporting large differences between their hypnosis and hidden observer trials. Alternatively, the LA instructions themselves may have been less intuitive than the MA instructions for some of our participants. As noted above, given the sequence of trials and the fact that participants had just reported that they completed the arm suspension task relatively effortlessly during hypnosis, some participants may have anticipated that accessing a 'hidden part' of their mind should result in greater rather than less awareness of the amount of effort required to complete the task. Additional studies are needed to examine more critically how participants interpret the various hidden observer instructions.

An important feature of this study was the inclusion of low hypnotizable, simulating participants. Both reals and simulators rated the arm suspension task comparably during the baseline and post-session trials. Perhaps reflecting fatigue, both groups reported that the arm suspension task required more effort during the last (post-session) trial than during the first (baseline) trial. Throughout the study, simulators successfully mimicked the behaviour of high hypnotizables with some important exceptions. First, simulators exaggerated the effects of hypnosis by reporting that the arm suspension task during hypnosis required less effort than that reported by reals. Second, although failing to reach statistical significance, simulators tended to report higher amounts of effort under MA instructions and lower amounts of effort under LA instructions compared with reals. Finally, at the conclusion of the study, simulators overestimated the depth of hypnosis experienced by high hypnotizable participants. These real-simulator differences are consistent with previous studies (e.g. Williamsen, Johnson and Erikson, 1965; Hilgard, 1977; Spanos, deGroot and Gwynn, 1987; Green et al., 1990) showing that simulators often overplay their role and overestimate the effects of hypnosis. The fact that the hidden observer reports generated by simulators and reals were statistically indistinguishable from one another suggests that the pattern of results can parsimoniously be explained by the cues embedded within the instructions without recourse to special hypnotic processes, a unique state of consciousness, or particular hypnotic ability.

While we conjecture that the hidden observer paradigm itself may be interpreted by some participants as an experimental expectation for increased awareness of effort, the fact that Spanos et al. (1983) failed to find any difference between hypnosis and 'low-cue' hidden observer reports tempers our confidence in this hypothesis. Regardless of how the NIC instructions were ultimately interpreted by participants, the fact that a majority of hidden reports predictably increased or decreased as a function of MA or LA instructions argues against a strict neodissociative interpretation.

We recognize that our design had several limitations and that we took liberty with some procedures commonly employed by other hidden observer studies. For example, we determined hypnotizability status on the basis of a single screening with the HGSHS:A. A second, more thorough assessment of hypnotizability, for example, with the individually administered SHSS:C (Weitzenhoffer and Hilgard, 1962) would have confirmed hypnotizability status. Additionally, we collected data in a group versus individual format, and breaking with custom, at the end of the experiment we requested that simulators disclose their status on the last page of their response booklet while the hypnotist was still in the room. A major limitation was that we did not ask participants after the experiment about their hidden observer experiences. It would have been especially helpful to examine how participants in the LA and the NIC conditions inter-

preted the hidden observer instructions. Future studies should interview participants about their hidden observer experience in an attempt to shed light on the implicit demands of the paradigm itself.

We agree with Laurence, Perry and Kihlstrom (1983) that hidden observer reports that vary according to demand characteristics and instructional information do not, in and of themselves, prove that the hidden observer phenomena is solely the result of social psychological variables. Indeed, all hypnotic responding, including hidden observer reports, occurs within the context of a social interaction and, as such, responsiveness to suggestions and individual experiences are likely affected by expectancies, motivations, and how participants interpret the hypnotist's communications (see Kihlstrom, 1998). The important question is not whether social psychological variables affect hidden observer reports, but whether such variables can reasonably account for the phenomenon. While we recognize that there is genuine disagreement within the field, we believe that the burden rests with those who claim that the hidden observer is something other than an experimental creation.

In conclusion, our research, which was the first to examine hidden observer instructions with an ideomotor suggestion, is consistent with the results of several studies that Spanos and his colleagues conducted on pain perception (Spanos and Hewitt, 1980; Spanos et al., 1983; Spanos, Radtke and Bertrand, 1984; Spanos, Flynn and Gwynn, 1988). Namely, we found that the wording of the instructions influenced the type of hidden observer reports produced. Our findings suggest that hidden observer phenomena are shaped by experimental demands and the explicitness of instructions, and by hypnotized participants' motivation to behave in a manner that is consistent with their expectations and beliefs of how a hypnotized person is supposed to perform under hidden observer instructions. We agree with Spanos's (1991) interpretation that so-called hidden observers 'reflect subjects' use of unfolding contextual information to generate enactments that are congruent with their beliefs concerning what is expected from them in the experimental situation' (p. 355). In short, we conclude that the social, interpersonal, and instructional context is critically important to understanding the generation of hidden observer reports.

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Notes

1 From pilot testing, we determined that nearly all participants could steadily hold their arm out in this manner for the duration of a 30-second trial.

2 While not significant at the $p < 0.05$ level, the interaction approached significance (i.e. $p = 0.10$). Inspection of the means showed that simulators tended to exaggerate the effect of the MA and LA instructions, relative to high hypnotizable participants.

3 Within the MA condition, both real (M =14.06, SD = 26.79) and simulating (M = 29.60, SD = 26.85) participants significantly increased their ratings, t's < 2.23, p's < 0.05. While the average difference score across both real and simulating participants in the NIC condition significantly differed from zero, the scores failed to reach significance when broken down by real (M = 6.65, SD = 23.37) and simulating (M = 4.54, SD = 15.72) groups, t's < 1.53.

4 Nine out of 124 (7.3%) participants (four students in the LA and NIC conditions, one from the MA condition) failed to evidence a hidden observer by reporting the exact same rating across the

hypnosis and hidden observer trials. In order to have sufficient observed and expected cell frequencies for the MFA, these nine individuals were excluded so that the Rating Direction variable could be dichotomized into 'greater' or 'lesser' reported effort during the hidden observer trial relative to the hypnosis trial. As a result, the non-parametric analyses were based on an $n = 115$.

5 When the CxR association was analysed in multiple 2x2 Chi-square tests, the results were as follows: (a) participants in the MA condition were more likely to report greater effort during the hidden observer trial, relative to the hypnosis trial, than were participants in the LA condition, $X2(1, n = 73) = 13.31$, $p < 0.001$; (b) participants in the LA condition, compared to those in the NIC condition, were less likely to report greater effort during the hidden observer trial than the hypnosis trial, $X2$ (2, $n = 86$) 7.21, $p < 0.005$; and (c) reports of greater effort during the hidden observer trial did not significantly differ between the MA and NIC conditions, $X2(2, n = 89) = 1.67$.

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