Hypnotically Induced Emotional Numbing: The Roles of Hypnosis and Hypnotizability

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HYPNOTICALLY INDUCED EMOTIONAL NUMBING: 
The Roles of Hypnosis and Hypnotizability

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Abstract: This study investigated the roles of hypnotizability and hypnosis in suggested emotional numbing. Thirty-two high hypnotizable and 32 low hypnotizable participants were administered either a hypnotic or wake induction and were then presented with emotionally distressing and neutral images during a suggestion for emotional numbing or a control condition. Emotional response was indexed through self-report and EMG corrugator-muscle activity. High hypnotizable participants, in both the hypnosis and wake conditions, reported more diminished emotional responses on self-report and EMG corrugator-muscle activity than low hypnotizable participants during the emotional-numbing suggestion. These findings suggest that elevated hypnotic susceptibility, rather than hypnosis, is an important mediator of emotional numbing. The importance of individual differences in emotional numbing is discussed.

THE ROLES OF HYPNOSIS AND HYPNOTIZABILITY

Emotional numbing describes the lack of emotional responsivity to stimuli that would normally elicit emotional responses. Emotional numbing is reported in a range of clinical disorders, and primarily posttraumatic stress disorder (Litz, 1992). Despite its importance, the parameters and mechanisms of emotional numbing are poorly understood. A major reason for the paucity of knowledge about emotional numbing is the lack of appropriate paradigms to investigate this phenomenon. Suppressing emotional responses has been attempted using a range of paradigms (Richards & Gross, 2000; Wegner, Erber, & Zanakos, 1993).

A recent approach has employed hypnosis as a tool to limit awareness of emotional experience. Hypnosis can limit awareness of sensory and cognitive experiences, including vision (Bryant & McConkey, 1989a) and affective responses to pain (L. Wilson, 1989). Case studies
(Weiss, Blum, & Gleberman, 1987) and experimental studies (Bryant & McConkey, 1989b) indicate that hypnosis can effectively modify emotional response. In an initial study of hypnotic emotional numbing, Bryant and Kourch (2001) reported that in response to a hypnotic suggestion for emotional numbing high, but not low, hypnotizable participants displayed minimal emotional responsivity to aversive visual stimuli. Further, hypnotic emotional numbing inhibited reported emotional response and facial expressions of affective response. Using a similar paradigm that presented emotional material under subliminal conditions, we demonstrated that hypnotic emotional numbing was able to influence emotional processing at a preconscious level (Bryant, 2005). In recognition of the possibility that hypnotic responses may be an artifact of characteristics (Spanos, 1986), a subsequent study compared the responses of hypnotized high hypnotizable and simulating low hypnotizable participants, of whom half received a suggestion for hypnotic emotional numbing (Bryant & Mallard, 2002). In response to presentations of neutral and aversive visual stimuli, reals and simulators who received the emotional-numbing suggestion reported comparably less responsivity to distressing stimuli than other participants. Whereas simulators who received the numbing suggestion had markedly suppressed corrugator activity, reals revealed no increase in corrugator response. This study indicated that emotional numbing could not be attributed simply to demand characteristics. Although some theorists have suggested that the experiential and physiological features of emotion may be dissociated (Kihlstrom, Mulvaney, Tobias, & Tobis, 1999), these findings indicate that emotional expression may have been inhibited by suppression of emotional experience.

Although these earlier studies have indicated the utility of hypnosis to inhibit emotional response, previous studies have not delineated between the roles of hypnosis and hypnotizability. That is, previous studies have not investigated emotional numbing in high and low hypnotizable participants who did not receive a hypnotic induction. High hypnotizability is associated with a range of specific cognitive abilities outside of hypnosis, including imaginative capacity, suggestibility, and fantasy proneness (Glisky, Tataryn, Tobias, Kihlstrom, & McConkey, 1991). The characteristics of high hypnotizability, and not hypnosis, may be responsible for the observed effects of hypnotic emotional numbing in previous studies (Kirsch & Braffman, 2001). Accordingly, the primary goal of this study was to delineate the relative contributions of hypnosis and hypnotizability to hypnotic emotional numbing.

This study compared the responses of high and low hypnotizable participants who were administered either a hypnotic or nonhypnotic induction procedure. Participants were then presented with neutral and aversive pictorial stimuli either during a suggestion for emotional
numbing or during a control condition and required to rate their emotional
responses. In recognition of the need to index emotional response through
multiple measures (Caccioppo, Berntson, Sheridan, & McClintock, 2000),
we also indexed corrugator-muscle response. On the basis that hypnosis
is associated with stronger responding to hypnotic suggestion, we
hypothesized that high hypnotizable participants in the hypnosis condi-
tion during the emotional-numbing suggestion would display less emo-
tional response than highs in the wake condition, who in turn would be
less emotionally responsive than low hypnotizable participants.

METHOD

Participants

Participants were first-year undergraduate psychology students at
the University of New South Wales who received research credit for
their participation. The sample comprised 16 (9 female and 7 male)
high hypnotizable, hypnotized participants of mean age 23.25 years
(SD = 9.074); 16 (13 female and 3 male) high hypnotizable, wake partic-
ips of mean age 20.375 years (SD = 2.802); 16 (11 female and 5 male)
low hypnotizable, hypnotized participants of mean age 20.313 years
(SD = 5.63); and 16 (10 female and 6 male) low hypnotizable, wake par-
ticipants of mean age 20.75 years (SD = 6.116). Participants were prese-
lected on the basis of their scores on both a modified 10-item version
(excluding finger lock and communication inhibition) of the Harvard
Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A; Shor &
Orne, 1962) and the 12-item Stanford Hypnotic Susceptibility Scale,
Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962). Highs were selected
if their scores were in the range of 7 to 10 on the HGSHS:A (M = 8.375,
SD = 1.428) and 9 to 12 on the SHSS:C (M = 9.813, SD = 1.56). Lows
were selected if their scores were in the range 0 to 2 on the HGSHS:A
(M = 1.198, SD = 0.836) and 0 to 3 on the SHSS:C (M = 1.482, SD =
1.075). High and low hypnotizable participants were randomly allo-
cated to hypnosis or wake conditions.

Materials

Twelve color photographic images were selected from the Interna-
tional Affective Picture System (IAPS; Lang, Bradley, & Cuthbert,
1999). These images, which have normative data for arousal and
valence, have documented ability to elicit physiological responses
indicative of positive, neutral, and negative affect (Lang et al.). Six neu-
tral stimuli depicting domestic objects were selected on the basis of
low arousal and neutral valence (valence: M = 5.05, SD = 0.36; arousal:
M = 2.88, SD = 0.27) and six negative stimuli depicting mutilated bod-
ies on the basis of high arousal and negative valence (valence: M =
1.49, SD = 0.28; arousal: M = 7.08, SD = 0.46).
Facial EMG recording focused on the corrugator facial muscle, because this is a reliable index of expression of negative affective states (Caccioppo, Bush, & Tassinary, 1992). EMG activity was recorded via 4-mm diameter Sensor-Medics Ag-AgCl electrodes filled with Beckman electrolyte and attached by adhesive collars over the corrugator site, following guidelines by Fridlund and Caccioppo (1986). The EMG electrodes were connected to a Coulbourn Instruments high gain bioamplifier (S75–01) that was set to filter signals less than 90 Hz or more than 1000 Hz. Signals were rectified and integrated with a 500 ms time constraint by the Coulbourn Instruments contour-following integrator (S76–01). EMG signals were digitized by a Coulbourn Instruments Labline Computer Interface (L18–16).

Procedure

After participants were informed that the experiment was investigating “how people react to different emotional stimuli that may or may not involve hypnosis,” participants were administered written informed consent procedures. The experimenter then attached EMG electrodes. Participants in the hypnosis condition then received a 20-minute hypnotic induction (based on the SHSS:C induction) and a number of unrelated hypnotic suggestions. These included an ideomotor suggestion of moving hands apart, a challenge suggestion of finger lock, and a challenge of verbal inhibition (name). Wake participants were administered two filler tasks during the initial 20 minutes. The first involved dividing an L-shaped figure into four identical parts. The second task involved checking pairs of numbers or names to determine whether they are the same or different to each other. At this point, half the participants (Order A) in both hypnosis and wake conditions received a 1-minute emotional-numbing suggestion. The emotional-numbing suggestion instructed participants that they would be “unable to feel any emotions,” and they would feel “emotionally numb” and “cut off from any emotional responses.” All participants were then informed that they would be shown a series of slides and that they would be required to rate on a 100-point scale how they felt as they looked at each slide (0 = very negative, 100 = very positive). Following this, the six neutral and six negative slides were presented in alternating order, with a presentation time of 15 seconds and an interstimulus interval of 15 seconds. Following presentation of the slides, the emotional-numbing suggestion was canceled and a filler task was administered. The 12 slides were then presented for a second time, followed by other unrelated hypnotic items, and then a deinduction procedure was administered. Participants in Order B received the same experimental procedure, except that these participants were presented the slides prior to the emotional-numbing suggestion, then administered the emotional-numbing suggestion, followed by the second presentation of the slides.
RESULTS

Preliminary Analyses

Prior to the major analyses, a 2 (order) × 2 (hypnotizability) × 2 (induction) × 2 (numbing) × 2 (valence) multivariate analysis of variance (MANOVA) was conducted on the self-report and EMG data. There were no main or interaction effects for order. Accordingly, all subsequent analyses collapsed the two order conditions. Subsequent analyses conducted 2 (hypnotizability) × 2 (induction) × 2 (numbing) × 2 (valence) mixed-model ANOVAs. Post hoc Tukey analyses were conducted to determine simple effects ($p < .05$).

Separate 2 (hypnotizability) × 2 (induction) ANOVAs on age, HGSHS:A and SHSS:C scores indicated no significant main or interaction effects for age. As expected, there were significant main effects for HGSHS:A, $F(1, 62), p < .01$, and SHSS:C, $F(1, 62), p < .01$, scores, but no significant interaction effects. That is, whereas high hypnotizable participants scored higher on both hypnotizability measures than low hypnotizable participants, hypnotizability did not differ across induction conditions.

Self-Report Responses

The mean ratings of emotional responses are presented in Table 1. A 2 (hypnotizability) × 2 (induction) × 2 (numbing) × 2 (valence) mixed-model ANOVA conducted on self-report ratings indicated

<table>
<thead>
<tr>
<th></th>
<th>Neutral</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Hypnotizable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbing</td>
<td>53.00 (8.75)</td>
<td>38.65 (16.03)</td>
</tr>
<tr>
<td>Control</td>
<td>48.94 (12.33)</td>
<td>9.62 (10.58)</td>
</tr>
<tr>
<td>Wake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbing</td>
<td>50.21 (4.70)</td>
<td>30.74 (14.74)</td>
</tr>
<tr>
<td>Control</td>
<td>50.68 (7.11)</td>
<td>10.79 (12.88)</td>
</tr>
<tr>
<td><strong>Low Hypnotizable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbing</td>
<td>52.92 (11.34)</td>
<td>17.86 (14.08)</td>
</tr>
<tr>
<td>Control</td>
<td>55.00 (15.81)</td>
<td>17.48 (10.94)</td>
</tr>
<tr>
<td>Wake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbing</td>
<td>49.89 (1.75)</td>
<td>21.95 (14.47)</td>
</tr>
<tr>
<td>Control</td>
<td>49.95 (2.88)</td>
<td>17.74 (12.92)</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations appear in parentheses.
significant main effects for valence, $F(1, 60) = 310.34, p < .001$, and numbing, $F(1, 60) = 51.47, p < .001$. Participants reported experiencing more negative emotion during presentation of negative than neutral slides. Similarly, they reported more negative emotion in the control than emotional-numbing condition. There were significant interaction effects between hypnotizability and numbing, $F(1, 60) = 26.53, p < .001$, and numbing and valence, $F(1, 60) = 60.54, p < .001$; these effects were moderated by a significant three-way interaction between numbing, valence, and hypnotizability, $F(1, 60) = 34.827, p < .001$. Hypotheses concerning the effects of the numbing suggestion on negative stimuli were investigated by follow-up Hypnotizability $\times$ Numbing ANOVAs on ratings of negative slides. There was a main effect for numbing, $F(1, 62) = 76.57, p < .001$, and a significant interaction effect, $F(1, 62) = 41.54, p < .001$. Whereas high and low hypnotizable participants rated the negative slides comparably in the control condition, highs in the numbing condition rated the negative slides less negatively than lows in the numbing condition ($p < .05$). Further, highs in the numbing condition rated the negative slides less negatively than highs in the control condition ($p < .05$).

**EMG Responses**

EMG responsivity of the corrugator facial muscle was recorded prior to slide presentation and during slide presentation. The mean EMG change scores are presented in Table 2. Change scores were calculated

<table>
<thead>
<tr>
<th></th>
<th>Neutral</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Hypnotizable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypnosis Numbing</td>
<td>−0.47 (2.08)</td>
<td>0.23 (0.51)</td>
</tr>
<tr>
<td>Control</td>
<td>−0.34 (0.72)</td>
<td>1.60 (3.66)</td>
</tr>
<tr>
<td>Wake Numbing</td>
<td>−0.00 (0.94)</td>
<td>0.28 (0.81)</td>
</tr>
<tr>
<td>Control</td>
<td>−0.19 (1.32)</td>
<td>1.28 (2.55)</td>
</tr>
<tr>
<td>Low Hypnotizable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypnosis Numbing</td>
<td>0.18 (0.52)</td>
<td>1.31 (1.97)</td>
</tr>
<tr>
<td>Control</td>
<td>0.14 (0.51)</td>
<td>1.66 (2.36)</td>
</tr>
<tr>
<td>Wake Numbing</td>
<td>0.39 (0.75)</td>
<td>2.88 (2.70)</td>
</tr>
<tr>
<td>Control</td>
<td>0.00 (1.25)</td>
<td>1.17 (2.24)</td>
</tr>
</tbody>
</table>

*Note.* EMG change scores were calculated by subtracting the mean EMG value during the baseline period from the mean EMG value during slide presentation. Standard deviations appear in parentheses.
by subtracting the mean EMG value during the baseline period from the mean EMG value during slide presentation. A 2 (hypnotizability) × 2 (induction) × 2 (numbing) × 2 (valence) mixed-model ANOVA conducted on EMG data indicated significant main effects for valence, $F(1, 60) = 7.96, p < .001$, and hypnotizability $F(1, 60) = 8.35, p < .005$. Participants displayed more corrugator activity during presentation of negative than neutral slides, and highs displayed less EMG activity than lows. There was a significant interaction effect between hypnotizability and numbing, $F(1, 60) = 5.83, p < .05$, and a significant three-way interaction between numbing, valence, and hypnotizability, $F(1, 60) = 4.04, p < .05$. Whereas lows in the numbing and control conditions displayed comparable levels of EMG activity, highs in the numbing condition displayed less EMG activity than those in the control condition ($p < .05$). Hypotheses concerning the effects of the numbing suggestion on negative stimuli were investigated by Hypnotizability × Numbing ANOVAs on ratings of negative slides. There was a significant interaction effect, $F(1, 62) = 5.55, p < .05$. Whereas high and low hypnotizable participants in the control condition displayed comparable EMG activity in response to the negative slides, highs in the numbing condition displayed less EMG activity than lows in the numbing condition ($p < .05$). Further, highs in the numbing condition displayed less EMG activity than highs in the control condition ($p < .05$).

**DISCUSSION**

High hypnotizable participants given a numbing suggestion displayed on self-report and EMG activity that they were less responsive to the aversive stimuli than low hypnotizable participants, regardless of whether they were administered a hypnotic induction prior to the numbing suggestion. This finding accords with previous reports that hypnotic emotional-numbing results in diminished emotional experience and expression in individuals who have an aptitude for hypnosis (Bryant & Kourch, 2001; Bryant & Mallard, 2002).

Contrary to prediction, high hypnotizable participants in the hypnotic and wake conditions displayed comparable reductions in emotional response during the suggested emotional numbing. This finding indicates that elevated levels of hypnotizability, rather than hypnosis per se, is associated with successful response to a suggestion for emotional numbing. This finding accords with previous research that has found comparable effects for hypnotic and nonhypnotic suggestions in high hypnotizable participants (Kirsch & Braffman, 2001). Further, this finding is consistent with previous demonstrations that nonhypnotic instructions to inhibit emotional response can be successful (e.g., Jackson, Malmstadt, Larson, & Davidson, 2000).
Several explanations may be offered for the comparable responses of high hypnotizable participants in the hypnotic and wake conditions. First, high hypnotizable levels are associated with increased levels of absorption (Roche & McConkey, 1990), openness to experience (Glisky et al., 1991), and fantasy-proneness (S. C. Wilson & Barber, 1982). It is possible that the instructions for emotional numbing motivated high hypnotizable participants, who had the requisite cognitive skills, to implement strategies to limit emotional responding. In this context, it is interesting that openness to experience, which is associated with hypnotizability (Glisky et al.), correlates with measures of emotional expressivity (Gross & John, 1998).

Alternately, we recognize that prior to the present experiment our participants had undergone two separate hypnosis-screening assessments. This prior experience with hypnosis may have resulted in our laboratory being associated with hypnosis, and participants in the wake condition may have constructed the wake induction and subsequent suggestions within a hypnotic context (Spanos, 1986). There is evidence that the expectation of hypnosis and the administration of hypnotic-like tasks can produce “hypnotic behavior” in the absence of a formal hypnotic induction (Weitzenhoffer, Gough, & Landes, 1959). We may not have clearly distinguished between the hypnotic and nonhypnotic contexts sufficiently to ensure that high hypnotizable participants in the wake condition did not perceive the suggestion for emotional numbing as “hypnotic” (Kirsch & Braffman, 2001).

We recognize a number of limitations in this study. First, we did not index responses to positive stimuli, and it is unknown how these findings would generalize to differently valenced stimuli. Second, we did not assess for more specific cognitive styles that may comprise hypnotizability. Hypnotizability is a general construct that has been associated with a number of component features, including imaginative involvement, dissociation, suggestibility, and other related constructs (Kirsch & Braffman, 2001). Future research should delineate the specific cognitive styles that may facilitate emotional numbing. Third, we did not index the potential influence of demand characteristics on participants’ responses. Replication of this study with a real-simulating paradigm (Orne, 1969) would clarify the role of demand characteristics in suggested emotional numbing. Although our previous work (Bryant & Mallard, 2002) suggests that hypnotic emotional numbing cannot be attributed wholly to demand characteristics, we cannot rule out the possibility that participants in the current study did not provide self-report and facial expressive responses as a result of perceived experimental demands. Finally, the delineation of hypnotic and non-hypnotic emotional numbing should be more rigorously investigated by explicitly defining the experimental context as nonhypnotic.
The understanding of emotional numbing requires closer investigation of the individual differences between people who can and cannot successfully inhibit emotional response. Current models of emotional expression recognize the importance of individual differences (Gross & John, 1998). The current findings suggest that considering components of hypnotizability may be important in developing our understanding of the mechanisms underpinning effective emotional numbing.

REFERENCES


Hypnotisch induzierte emotionale Taubheit: Einfluss von Hypnose und Hypnotisierbarkeit

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Insensibilisation émotionnelle induite par hypnose: Les rôles de l’hypnose et de l’hypnotisabilité

Richard A. Bryant et Amrita Kapur

Résumé: Cette recherche explore les rôles de l’hypnotisabilité et de l’hypnose dans une insensibilisation émotionnelle suggerée. Trente-deux
participants fortement hypnotisables et trente-deux participants faiblement hypnotisables recevaient soit une induction hypnotique, soit une induction d’éveil, puis on leur présentait des images émotionnellement perturbants ou neutres, au cours d’une suggestion visant l’insensibilisation émotionnelle ou d’une condition contrôle. La réponse émotionnelle était indexée selon l’auto-déscription du participant et la mesure par EMG de l’activité du corrugator. Les participants fortement hypnotisables présentaient des réponses émotionnelles diminuées de façon plus importante que les participants faiblement hypnotisables au cours de la suggestion d’insensibilisation émotionnelle, aussi bien selon leur auto-déscription que selon la mesure par EMG de l’activité du corrugator. Ces résultats suggèrent qu’une sensibilité élevée à l’hypnose, plutôt que l’hypnose, est un médiateur important de l’insensibilisation émotionnelle. L’importance des différences individuelles par rapport à l’insensibilisation émotionnelle est examinée.

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Entumecimiento emocional inducido hipnóticamente: Los roles de la hipnosis y la hipnotizabilidad

Richard A. Bryant y Amrita Kapur

Resumen: Este estudio investigó los roles de la hipnotizabilidad y la hipnosis en el entumecimiento emocional inducido. Se administraron inducciones hipnóticas o de vigilia a 32 participantes con alta y 32 con baja hipnotizabilidad y después se presentaron imágenes emocionalmente angustiantes o neutrales durante sugestiones para entumecimiento emocional o una condición control. Se midió la respuesta emocional mediante auto-informes y la actividad EMG del músculo corrugador. Durante la sugestión de entumecimiento emocional, los participantes con alta hipnotizabilidad, tanto en condiciones de hipnosis como de vigilia, mostraron respuestas emocionales disminuidas en el auto-informe y la actividad EMG del músculo corrugador en comparación con participantes bajos en hipnotizabilidad. Estas conclusiones sugieren que la alta susceptibilidad hipnótica, más que la hipnosis, es un mediador importante del entumecimiento emocional. Se discute la importancia de las diferencias individuales en el entumecimiento emocional.

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University of Lund, Sweden