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HYPNOTIC EMOTIONAL NUMBING: A Study of Implicit Emotion

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Abstract: Twenty high hypnotizable and 20 low hypnotizable participants were administered a hypnotic induction and then presented with emotionally distressing and neutral visual images. Half the participants were administered a suggestion for emotional numbing. Participants were then asked to rate the valence of neutral words that were preceded by subliminal presentations of the negative and neutral images. Whereas highs who received the emotional-numbing suggestion reported comparable ratings of the words following presentations of the negative and neutral images, highs in the control condition and lows in both conditions reported more positive ratings of words that were preceded by the negative stimuli. These findings suggest that the subliminally presented negative stimuli led participants to rate the subsequent neutral words more positively. In contrast, hypnotic emotional numbing diminished this pattern in highs. These results are discussed in terms of the influence of hypnotic emotional numbing at a preattentive stage of processing.

Emotional numbing involves a lack of emotional responsivity to stimuli that would normally elicit emotional responses. Emotional numbing is reportedly common in a number of psychological disorders (Litz, 1992). Despite the apparent prevalence of emotional numbing, its mechanisms and parameters are poorly understood. One recent line of investigation has applied hypnosis to better understand emotional numbing. Hypnosis has a long tradition in inhibiting awareness of a range of sensory and affective experiences, including affective responses to pain (Wilson, 1989). Recent evidence suggests that emotional numbing can be effectively achieved by hypnotic suggestion. Case studies indicate that posthypnotic suggestion for specific emotional states modifies facial emotional reactivity (Weiss, Blum, & Gleberman, 1987), and experimental studies demonstrate that hypnotically induced emotions result in specific physical reactions (Bryant & McConkey, 1989c). In a pilot study on 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. In a subsequent study, we demonstrated that a hypnotic suggestion for emotional numbing resulted in no change in corrugator muscle activity in response to aversive stimuli; importantly, this pattern was not observed in simulators (Bryant & Mallard, 2002). This finding suggests that diminished emotional responding in hypnotic emotional numbing cannot be attributed simply to the effects of demand characteristics.

One of the outstanding questions concerning emotional numbing is the stage of processing at which it may occur. Does it occur at a preattentive stage or is it a compensatory response that occurs after registration of the aversive content? Kihlstrom, Mulvaney, Tobias, and Tobis (2000) propose that emotion can occur at an implicit level, such that different mental representations of an emotional response can be dissociated from each other. In this sense, implicit emotion may operate in some ways that are conceptually similar to implicit memory or implicit perception (Schacter, 1990). There is evidence from neuropsychology, animal-learning studies, and clinical disorders that emotions that are outside awareness can influence ongoing thoughts and behaviors (see Kihlstrom et al., 2000; LeDoux, 1996). This perspective is consistent with prevailing theories of emotion that recognize that there are multiple systems of emotional response and that these different systems may function independently of each other (Schacter, 1990).

The current study investigated the stage of processing at which hypnotic emotional numbing may influence emotional response. This study administered a hypnotic induction to high and low hypnotizable participants and then administered a suggestion for emotional numbing to half the participants. We then presented participants with a series of negative and neutral pictorial stimuli on a visual display unit and obtained ratings of the stimuli (explicit index). We then presented participants with neutral words that were immediately preceded by subliminal presentations of aversive or neutral stimuli and asked participants to rate the pleasantness of each word. We hypothesized that whereas hypnotic emotional numbing (in high hypnotizable participants) would reduce emotional responses during supraliminal presentations, the suggestion would not influence responses during subliminal presentations.

**METHOD**

**Design**

A 2 (group: high vs. low) × 2 (numbing condition: numbing vs. control) × 2 (valence: neutral, negative) design was employed, with repeated measurement on the third factor.
Participants
Participants were undergraduate students at the University of New South Wales who participated in this experiment in return for research credit. The sample comprised 20 (5 male and 15 female) high hypnotizable participants of mean age 19.65 years (SD = 2.15) and 20 low hypnotizable participants of mean age 19.05 years (SD = 1.27). Low hypnotizable participants were included to allow inferences about the role of hypnotizability on responses. Participants were preselected on the basis of their extreme scores on a tailored 10-item version of the group-administered Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A; Shor & Orne, 1962), and they were classified as highs or lows on the basis of their performance on a 10-item tailored version of the individually administered Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962). Highs scored in the range of 7 to 10 (M = 8.65, SD = 0.76) on the HGSHS:A and 8 to 10 (M = 9.6, SD = 1.19) on the SHSS:C. Lows scored in the range of 0 to 3 on the HGSHS:A (M = 1.95, SD = 0.97), and 0 to 3 on the SHSS:C (M = 1.35, SD = 1.22).

Materials
Ten color photographic images were selected from the International 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.). Five neutral 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 five negative stimuli depicting mutilated bodies on the basis of high arousal and negative valence (valence: M = 1.49, SD = 0.28; arousal: M = 7.08, SD = 0.46). Two lists of 12 neutral words were developed that were matched for frequency, valence, and syllabic length (Francis & Kucera, 1982). Twelve words were preceded by a neutral image, and 12 were preceded by a negative image. The association of the word list and the valence of the images was counterbalanced.

Procedure
Following informed consent procedures, the experimenter administered a 20-minute hypnotic induction (based on the SHSS:C induction) and a number of unrelated hypnotic suggestions (including suggestions for arm levitation, arm immobilization, and delusion). Participants in the emotional-numbing condition were then administered a suggestion 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 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 five neutral and five negative slides were presented in alternating order, with a presentation time of 5 seconds and an interstimulus interval of 11 seconds. Following presentation of the slides, participants were told that they would be shown a series of 24 neutral words. They were instructed that they would be asked to rate “how pleasant or unpleasant you think the word is on a 100-point scale where 0 means very unpleasant and 100 means very pleasant.” Prior to the presentation of each word, participants were randomly presented with the five neutral and five negative stimuli. Each presentation occurred for 16.7 ms and was immediately backward masked by a series of XXX letters for 16.7 ms. Each word was presented for 3 seconds, and there was a 3-second interstimulus interval between the end of the word presentation and the onset of the next trial. Following this task, the emotional-numbing suggestion was canceled for participants in the emotional-numbing condition. Participants were administered suggestions for other unrelated hypnotic items and then administered a deinduction procedure.

Awareness checks of the subliminal presentations were then conducted. Participants were presented with four presentations of the neutral and four presentations of the negative stimuli in alternating order under the subliminal condition. After each presentation, participants were asked to decide if the presentation had been a face or an object. This task provided an index of the extent to which participants were able to detect the content of the subliminal presentations. The experimenter then answered any questions, debriefed participants and concluded the experiment.

**RESULTS**

*Explicit Ratings*

Table 1 presents the mean self-report ratings of the supraliminally presented pictures. A 2 (hypnotizability) × 2 (numbing condition) × 2 (valence) mixed-model analysis of variance (ANOVA) indicated significant main effects for numbing condition, $F(1, 36) = 29.95, p < .001$; hypnotizability, $F(1, 36) = 15.91, p < .001$; and valence, $F(1, 36) = 233.90, p < .001$; and significant interaction effects for Valence × Numbing Condition, $F(1, 36) = 21.76, p < .001$; Valence × Hypnotizability, $F(1, 36) = 10.96, p < .005$, and Hypnotizability × Numbing Condition, $F(1, 36) = 10.35, p < .005$. These interactions were mediated by a three-way interaction between hypnotizability, valence, and numbing condition, $F(1, 36) = 11.52, p < .005$. The three-way interaction was investigated by separate Hypnotizability × Numbing Condition ANOVAs for neutral and negative stimuli, respectively. A 2 (hypnotizability) × 2 (numbing condition) ANOVA of ratings for neutral stimuli indicated no significant
effects. A 2 (hypnotizability) × 2 (numbing condition) ANOVA of ratings for negative stimuli indicated significant main effects for hypnotizability, $F(1, 36) = 14.55, p < .001$; numbing condition, $F(1, 36) = 22.60, p < .001$; and significant interaction effect, $F(1, 36) = 12.05, p < .001$. Specifically, lows reported comparable ratings of neutral stimuli across the numbing and control conditions, highs in the numbing condition made less negative ratings than highs in the control condition ($p < .001$).

Implicit Ratings

Table 1 also presents the mean self-report ratings of the subliminally presented pictures. A 2 (hypnotizability) × 2 (numbing condition) × 2 (valence) mixed-model ANOVA indicated significant main effects for numbing condition, $F(1, 36) = 6.59, p < .01$; and valence, $F(1, 36) = 39.17, p < .001$; and significant interaction effects for Valence × Numbing Condition, $F(1, 36) = 12.59, p < .001$; Valence × Hypnotizability, $F(1, 36) = 5.23, p < .05$; and Hypnotizability × Numbing Condition, $F(1, 36) = 9.12, p < .005$. These interactions were mediated by a three-way interaction between hypnotizability, valence, and numbing condition, Valence × Numbing Condition, $F(1, 36) = 4.02, p < .05$. The three-way interaction was investigated by separate Hypnotizability × Numbing Condition ANOVAs for neutral and negative stimuli, respectively. A 2 (hypnotizability) × 2 (numbing condition) ANOVA of ratings for neutral stimuli indicated no significant effects. A 2 (hypnotizability) × 2 (numbing condition) ANOVA of ratings for negative stimuli indicated

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td>Mean Ratings</td>
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<tr>
<th></th>
<th>Neutral</th>
<th>Negative</th>
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<tr>
<td><strong>Explicit Ratings (Pictures)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Numbing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>51.17 (3.13)</td>
<td>43.80 (8.18)</td>
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<tr>
<td>Low</td>
<td>51.22 (1.89)</td>
<td>18.67 (14.02)</td>
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<tr>
<td>Control</td>
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<tr>
<td>High</td>
<td>51.67 (5.82)</td>
<td>14.03 (13.21)</td>
</tr>
<tr>
<td>Low</td>
<td>50.17 (1.02)</td>
<td>12.85 (6.16)</td>
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<tr>
<td><strong>Implicit Ratings (Words)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbing</td>
<td></td>
<td></td>
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<tr>
<td>High</td>
<td>48.90 (3.36)</td>
<td>47.96 (3.46)</td>
</tr>
<tr>
<td>Low</td>
<td>50.83 (3.35)</td>
<td>55.03 (2.48)</td>
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<tr>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>52.32 (8.18)</td>
<td>58.02 (4.67)</td>
</tr>
<tr>
<td>Low</td>
<td>49.37 (2.71)</td>
<td>55.41 (2.85)</td>
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*Note: Standard deviations appear in parentheses.*
significant main effects for hypnotizability, $F(1, 36) = 4.13, p < .05$; numbing condition, $F(1, 36) = 22.64, p < .001$; and significant interaction effect, $F(1, 36) = 19.50, p < .001$. Whereas lows reported comparable ratings of neutral stimuli across the numbing and control conditions, highs in the numbing condition made less positive ratings than highs in the control condition ($p < .001$).

Subliminal Check

On the eight awareness-check trials, participants correctly classified 51% of trials. A 2 (hypnotizability) × 2 (numbing condition) ANOVA of awareness-check scores indicated no significant differences between groups.

DISCUSSION

The finding that highs who were administered the emotional-numbing suggestion reported comparable affective ratings of supraliminally presented neutral and negative stimuli replicates previous reports that a hypnotic emotional numbing results in effective emotional numbing (Bryant & Kourch, 2001; Bryant & Mallard, 2002). Further, the observation of emotional numbing in highs, but not lows, reinforces previous reports that a suggestion for emotional numbing can be more readily achieved by only high hypnotizable participants (Bryant & Kourch).

The major goal of this study was to index the stage at which emotional numbing occurs. Highs who received the emotional-numbing suggestion rated the words that were preceded by subliminal presentations of negative stimuli more positively than highs who did not receive the numbing suggestion. It appears that highs who did not receive the numbing suggestion and lows who either did or did not receive the numbing suggestion rated the words that were preceded by subliminal negative stimuli more positively than words preceded by subliminal presentations of neutral stimuli. It is possible that participants may have rated the affective nature of the words in comparison to the subliminally presented stimuli. That is, the words may have been rated more positively following the negative stimuli because they were perceived as positive in contrast to the negative valence associated with the aversive stimuli. In contrast to this pattern, the highs who received the numbing suggestion did not display this influence. The different responses of emotionally numb participants suggest that they were not influenced by the subliminal stimuli in the same way as other participants.

One interpretation of this finding is that a suggestion for hypnotic emotional numbing mediates emotional processing at preattentive stages and operates on both implicit and explicit levels. This interpretation contrasts, in a manner, with evidence that hypnotically suggested alterations of other functions tend to operate at explicit, but not
implicit, levels. For example, there is evidence that hypnotic suggestions for amnesia (Kihlstrom, 1980), blindness (Bryant & McConkey, 1989a, 1989b, 1989c), and deafness (Crawford, Macdonald, & Hilgard, 1979; Scheibe, Gray, & Keim, 1968) result in reported diminishment of those senses; these participants are nonetheless influenced by relevant information on indirect tests that require those senses to be processing information. Differential responding on explicit and implicit tests during hypnotic suggestions has been explained in terms of the suggestion affecting episodic mental representations and allowing semantic representations to influence cognitive processing in an unaffected manner (Kihlstrom, 1987). It seems that hypnotic emotional numbing cannot be readily explained in terms of the implicit/explicit distinction. The current finding may be explained in terms of multiple system theories of emotion. For example, Leventhal’s perceptual-motor theory of emotion (Leventhal, 1984; Leventhal & Scherer, 1987) proposes that an emotional response is the product of the interaction of three distinct systems: the expressive-motor, schematic, and conceptual systems. This model suggests that whereas expressive-motor responses tend to be unconditioned reactions to stimuli, they can be modified by higher order cognitive strategies emanating from the conceptual system. Such a model implies that strategies elicited by the conceptual system may become effortless and may occur at early stages. The influence of the numbing suggestion on subliminally presented stimuli in the current study may be explained by the conceptual system affecting emotional response at a very early stage.

Implicit effects have also been explained in terms of social psychological perspectives. It has been suggested that observed implicit effects actually reflect the incomplete nature of hypnotic response and purportedly underscore the interpretation that social compliance is important in reported hypnotic effects (Spanos, de Groot, & Gwynn, 1987). It is possible that social factors influenced the current findings. We cannot rule out the possibility that emotionally numb participants employed strategies that limited encoding of the subliminal stimuli. Although the lexical decision task indicated that participants did not identify the content of the subliminal presentations, the ratings of words may reflect response to demand characteristics associated with the explicit suggestion for emotional numbing. Although previous work has indicated that hypnotic emotional numbing cannot be attributed simply to demand characteristics (Bryant & Mallard, 2002), future research should investigate preattentive stages of emotional processing using the real-simulating paradigm (Orne, 1979). Similarly, the specific nature of the suggestion may have influenced the responses. The structure of the suggestion for emotional numbing was similar to a negative hallucination, insofar as it suggested the blocking of a normal sensation. There is evidence that suggestions for positive and negative
hallucinations can result in distinctly different psychophysiological responses (Barabasz, Barabasz, Jensen, Calvin, Trevisan, & Warner, 1999). Future studies should alter the nature of the suggestion for numbing because it is possible that suggestions for more active, rather than passive, blocking of emotional responses may have involved different findings.

It is recognized that this study did not index facial expressive responses. Future work should use multiple indices of emotional response to subliminal stimuli during hypnotic emotional numbing. Evidence that facial electromyography (EMG) activity is activated by subliminal presentations of emotional stimuli (Dimberg, Thunberg, & Elmehed, 2000) underscores the need to obtain EMG responses in future research of preattentive processing during emotional numbing. It is also possible that the current measure of implicit processing may have been influenced by explicit factors associated with the subliminal presentation or with the close proximity of the implicit and explicit measures (Holender, 1986; Richardson-Klavehn, & Bjork, 1988). The extent to which hypnotic emotional numbing can effectively limit emotional responses at an early stage of processing will enhance our understanding of the mechanisms mediating both emotional responding and hypnotic suggestion.

REFERENCES


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**Hypnotisch vermittelte emotionale Taubheit: Eine Untersuchung impliziter Emotionen**

Richard A. Bryant

Zusammenfassung: Zwanzig gut hypnosefähigen und zwanzig wenig hypnosefähigen Teilnehmern wurde im Anschluss an eine hypnotische Induktion emotional unangenehme und neutrale Bilder gezeigt. Die Hälfte der Versuchspersonen erhielt Suggestionen zur emotionalen Taubheit. Die Teilnehmer sollten daraufhin die Valenz von neutralen Bildern bewerten, denen subliminal präsentierte negative oder neutrale Bilder vorangingen. Die gut Hypnosefähigen, welche zuvor die Suggestion zur emotionalen Taubheit erhalten hatten, gaben vergleichbare Bewertungen der Wörter,
HYPNOTIC EMOTIONAL NUMBING


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Insensibilité émotionnelle sous hypnose : une étude de l’émotion implicite

Richard A. Bryant

Résumé : 20 sujets fortement hypnotisables et 20 sujets faiblement hypnotisables ont reçu une induction hypnotique puis on leur a présenté des images visuelles neutres ou pénibles à voir. La moitié des participants reçoit une suggestion d’insensibilité émotionnelle. Il fut ensuite demandé aux participants de donner une valeur aux mots qui étaient précédés de présentations subliminales d’images négatives ou neutres. Alors que les ‘hautement hypnotisables’ ayant reçu la suggestion de rester insensibles rapportaient un ratio comparable des mots suivis de la présentation d’images neutres ou négatives, les ‘hautements’ hypnotisables dans le groupe de contrôle et les ‘faiblement’ hypnotisables dans les deux groupes rapportaient un résultat plus positif pour les mots précédés de stimuli négatifs. Ces résultats suggèrent que les stimuli négatifs introduits de façon subliminale ont amenés les participants à qualifier de façon plus positive les mots neutres qui suivaient. Par conséquent, l’insensibilité émotionnelle hypnotique diminuait cette tendance chez les ‘hautement’ hypnotisables. Ces résultats sont à évaluer dans le contexte d’influence hypnotique de l’insensibilité au stade de traitement précédent l’attention.

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Insensibilidad emocional hipnótica: Un estudio de emoción implícita

Richard A. Bryant

Resumen: Administré una inducción hipnótica a 20 participantes con alta hipnotizabilidad y a 20 con baja y luego presenté imágenes visuales negativas o neutrales. Se administró a la mitad de participantes una sugestión para adormecimiento emocional. Luego pedí a los participantes que evaluaran la valencia de palabras neutrales precedidas de presentaciones subliminales de imágenes negativas o neutrales. En tanto que los participantes con alta hipnotizabilidad que recibieron la sugestión de insensibilidad emocional
dieron evaluaciones semejantes de las imágenes negativas y neutrales, los muy hipnotizables en la condición control y los poco hipnotizables en ambas condiciones dieron calificaciones más positivas a las palabras precedidas por los estímulos negativos. Estos hallazgos sugieren que los estímulos negativos presentados subliminalmente dirigieron a los participantes a que valoraran las palabras neutrales subsecuentes más positivamente. En contraste, la insensibilidad emocional hipnótica disminuyó esta pauta en los altamente hipnotizables. Estos resultados se discuten en términos de la influencia de la insensibilidad emocional hipnótica en la etapa de procesamiento pre-atención.

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