The effect of rapid induction analgesia on subjective pain ratings and pain tolerance

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THE EFFECT OF RAPID INDUCTION ANALGESIA ON SUBJECTIVE PAIN RATINGS AND PAIN TOLERANCE

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Abstract: The effect of Rapid Induction Analgesia (RIA) on pain tolerance and ratings of mechanically induced pain in the pain-sensitized forearm was investigated in 58 undergraduates. Posthypnotic suggestions of relaxation and analgesia did not influence pain ratings or tolerance, but relaxation ratings increased after RIA. When suggestions for analgesia were made throughout pain testing, ratings of pain unpleasantness at the pain tolerance point decreased more in the RIA group than in the attention control group. However, RIA did not influence pain threshold or tolerance. It was concluded that RIA was more effective in reducing subjective reports of pain (particularly the affective component) than in altering pain tolerance, and that maintenance of hypnotic suggestions was more effective than posthypnotic suggestions of comfort and relaxation in alleviating the affective component of pain.

Hypnotic suggestions for comfort, relaxation and reappraisal of the pain experience can alleviate dental pain, headaches, burn pain, and cancer pain both in children and adults and can decrease or eliminate pain caused by ischaemia, electric shocks, immersion of a limb in ice-water, and noxious heat (Barber, 1977, 1996; Holroyd, 1996; Lynn, Kirsch, Barabasz, Cardeña, & Patterson, 2000; Montgomery, DuHamel, & Redd, 2000; Pinnell & Covino, 2000). However, despite the demonstrated effectiveness of hypnotic suggestions for pain reduction, there is still no consensus on the mechanism of the hypnotic effect or, indeed, on whether hypnotic procedures alter more than the subjective appraisal of painful experiences (Kihlstrom, 1998; Kirsch & Lynn, 1998; Woody & Sadler, 1998).

Part of the debate about mechanisms of hypnotic analgesia concerns the definition of pain, which is now recognized to be a multidimensional construct with sensory, affective, and behavioural components. In
particular, suggestions for hypnotic analgesia may differentially influence the sensory and affective dimensions of pain. To investigate this issue, Price and Barber (1987) measured pain intensity and unpleasantness to noxious skin heating before and after hypnotic induction. Pain ratings remained constant when the hypnotic state was not maintained during psychophysical testing. However, ratings of unpleasantness decreased substantially in subjects who were given cues for maintaining the hypnotic state during psychophysical testing. In addition, ratings of pain intensity decreased in the most hypnotically susceptible subjects. In a recent extension of this study, Keman, Dane, Phillips, and Price (1995) investigated the R-III nociceptive flexion reflex, a spinal withdrawal reflex, and pain ratings of the electrical stimulus that provoked the reflex during hypnotic analgesia. They identified a moderately strong association between decreases in pain intensity ratings and decreases in R-III and an additional weak association between decreases in unpleasantness ratings and the reduction in R-III.

The content of hypnotic suggestions may differentially influence reports of the intensity and unpleasantness of pain (Dahlgren, Kurtz, Strube, & Malone, 1995; Malone, Kurtz, & Strube, 1989). For example, Dahlgren et al. compared the effect of suggestions for analgesia with suggestions for relaxation on ratings of pain intensity and unpleasantness. Pain was induced by immersing the subject’s hand in cold water. Suggestions for analgesia reduced reports of pain intensity significantly more than pain unpleasantness, whereas suggestions for relaxation were more effective for unpleasantness ratings.

Taken together, the findings of these studies imply that several mechanisms contribute to hypnotic analgesia. The parallel reduction in R-III and pain intensity ratings suggests that hypnotic analgesia impacts on an antinociceptive mechanism in the spinal cord. This mechanism diminishes awareness of noxious stimulation by interfering with signal transmission, and this interference alters the affective response to pain. In addition to this direct antinociceptive action, the calming effect of hypnotic suggestions appears to alleviate feelings of distress that arise in response to pain.

In the present study, a hypnotic technique called Rapid Induction Analgesia (RIA) was used to induce analgesia (Barber, 1977, 1996). RIA includes suggestions that encourage reductions in tension, anxiety, and sensations of pain. RIA was successful in alleviating mild to moderate levels of dental pain both in hypnotically susceptible and unsusceptible patients (Gillett & Coe, 1984). In addition, RIA alleviated pain that was induced experimentally by noxious heat stimuli (Price & Barber, 1987), more so the distressing component of pain than the intensity component.

The present study aimed to extend upon the findings of Price and Barber (1987) by using mechanical instead of thermal sensations to induce
pain. This mode of pain induction was chosen because we planned, in a later study, to use hypnotic analgesia to alleviate pain experienced by burn patients during their regular dressing changes (Wright & Drummond, 2000). In particular, we wanted to find out whether hypnotic suggestions would decrease both pain intensity and the distress provoked by noxious mechanical stimulation, which is unavoidable during dressing changes in burn patients. Our initial aim was to determine whether posthypnotic suggestions of analgesia would alleviate pain because we intended to use this approach with burn patients (Wright & Drummond, 2000). Unfortunately, however, the findings were not encouraging either in the present study or in burn patients. Thus, we also investigated the analgesic effect of hypnotic suggestions during pain testing (Price & Barber, 1987).

Capsaicin, the pungent component of chili peppers, was used to sensitize cutaneous nociceptors to mechanical stimulation. Capsaicin increases sensitivity to touch and heat at the site of application (primary hyperalgesia) and also increases sensitivity to touch in the surrounding skin (secondary hyperalgesia). Secondary hyperalgesia appears to be mediated by sensitization of neurons in the dorsal horn of the spinal cord that are sensitive to a wide range of mechanical stimuli (Torebjörk, Lundberg, & La Motte, 1992). In contrast, primary hyperalgesia to capsaicin involves the peripheral sensitization of C-fibre polymodal nociceptors that probably supply a separate population of spinal nociceptors (La Motte, Lundberg, & Torebjörk, 1992). Because it is likely that both primary and secondary hyperalgesia contribute to pain experienced by burn patients during their dressing changes, capsaicin should be a useful model of this experience. Activation of tracts that descend from the brain stem inhibits the discharge of nociceptive neurons in the dorsal horn of the spinal cord (Basbaum & Fields, 1978). Hypnotic suggestions appear to mobilize this pain control system (Kiernan et al., 1995), but whether hypnosis has a similar impact on the intensity of primary and secondary hyperalgesia is unknown. Because primary hyperalgesia originates peripherally whereas secondary hyperalgesia develops in the spinal cord, a differential influence of RIA on primary and secondary hyperalgesia might provide some clues about the mechanism of hypnotic analgesia. Thus, an additional aim of our study was to compare the analgesic effects of RIA on primary and secondary hyperalgesia.

Finally, we wished to investigate whether RIA would have similar effects on subjective ratings and tolerance for pain. In particular, we reasoned that pain thresholds and tolerance of painful stimulation should increase during hypnosis if hypnotic suggestions help subjects to dissociate from pain entirely (Kihlstrom, 1998; Kirsch & Lynn, 1998; Woody & Sadler, 1998). Therefore, pain ratings were obtained for noxious stimulation at the pain tolerance point in addition to standard stimuli judged in
pilot studies (Wright & Drummond, 2001) to be mildly and moderately painful.

**METHOD**

**Subjects**

The sample consisted of 12 male and 46 female undergraduate students aged 18 to 55 years who were recruited by advertising the project in student tutorials. None of the subjects had any prior experience with hypnotic procedures. Each subject provided informed consent for the procedures, which were approved by the Murdoch University Human Ethics Committee.

**Instrumentation and Protocol**

*Application of capsaicin.* A 1% solution of capsaicin was prepared by dissolving 0.1 g of capsaicin powder (Sigma Chemicals) in 5 mL of distilled water and 5 mL of ethanol. After the skin had been cleaned with alcohol, a bandage containing 300 µL of the capsaicin solution was applied to the volar aspect of the nondominant forearm.

*Sensory testing.* Pain threshold and tolerance for static mechanical stimulation were measured with a pressure algometer. The algometer had a probe tip of 0.05 cm², which was applied to various sites on the capsaicin-treated and untreated arms. To identify the pain threshold and tolerance, pressure was applied perpendicularly at a steadily increasing intensity until the subject signalled pain (pain threshold) or until they signalled to stop (pain tolerance). The algometer was connected to a switch that the subject pressed upon reaching his or her pain threshold. Linked to the switch box was a transducer that provided a digital reading of the intensity and rate of increase of mechanical stimulation (calibrated in grams). In addition, standard mechanical stimuli (400 g and 800 g) were applied for 10 seconds at each site. These values were selected on the basis of pilot studies that indicated that stimulation at these levels induced mild to moderate pain in capsaicin-treated skin (Wright & Drummond, 2001). After the application of capsaicin, mechanical stimuli were applied to the capsaicin-treated site (area of primary hyperalgesia) and to the flushed skin surrounding the capsaicin-treated site (within the area of secondary hyperalgesia). An average of two measurements was obtained for each site.

*Visual Analogue Scales ratings.* Subjects’ sensory and affective ratings of ongoing pain and mechanical stimulation were recorded on 10 cm VAS (Price, McGrath, Rafii, & Buckingham, 1983). In addition, a VAS was provided for rating the subject’s relaxation state. Ratings were obtained before and after the hypnotic induction. Subjects were instructed to distinguish between the quality of pain intensity and its resulting discomfort by making an analogy between music and pain—
specifically between an ear-damaging volume of loud music and pain intensity, and between the discomfort generated by loud music “when one is trying to fall asleep” and the discomfort associated with pain (Price et al., 1983).

**Suggestions for hypnotic analgesia.** A modified version of Barber’s RIA (Barber, 1977) was administered to subjects in the treatment conditions. Similar to the original script, the hypnotic induction led subjects to visualize descending a staircase of 20 steps and counting each step during the descent. As they moved further down the staircase, they were given suggestions of increased relaxation and comfort, as well as suggestions for reappraising whatever sensation was felt on the treated arm. In particular, the suggestion was made that the arm that had been treated with capsaicin was feeling cool and numb, and that any sensations that were experienced were much more pleasant and comfortable than might have been expected. Once the count had reached 20—the bottom of the staircase—suggestions of relaxation and comfort were further emphasized to enhance whatever effect the induction had produced. In addition, the suggestion was made that later they would be reminded of the feeling of comfort and relaxation that they were now experiencing. The full RIA script is available from the authors.

**Procedure**

Upon arrival, subjects were told that the aim of the study was to determine the effect of relaxation on mild pain. They were tested individually in a room maintained at 21 ± 1°C. The subject sat in a comfortable armchair, and lighting was dimmed to make the setting more conducive to relaxation. After the procedures had been explained (but before the application of capsaicin), the pain threshold and pain tolerance were measured, and ratings of pain at the pain tolerance point and for the 400 g and 800 g stimuli were obtained. Next, capsaicin was applied topically to the forearm. Thirty minutes later, subjects rated ongoing pain and their level of relaxation on VAS. The pain threshold and pain tolerance were then measured, and subjects provided ratings of pain at pain tolerance and of the 400 g and 800 g stimuli at sites of primary and secondary hyperalgesia. Next, the RIA protocol was administered to 30 of the 58 subjects. The other 28 subjects read incidental material until pain testing resumed (see below).

**Pain testing after the intervention.** In 17 subjects administered RIA, the hypnotic induction was followed by a slow countdown from twenty to one, during which subjects were given suggestions of becoming more alert as they visualized themselves ascending the imaginary staircase. At the count of one, subjects were asked to open their eyes slowly and the suggestion was made to continue the state of relaxation they had attained. This procedure is similar to that used by Price and Barber (1987) in their experimental pain study and by Patterson and Ptacek
<table>
<thead>
<tr>
<th></th>
<th>Untreated Skin</th>
<th>Primary Site</th>
<th>Secondary Site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pain Threshold (kg)</strong></td>
<td>2.85 (1.44)</td>
<td>1.74 (0.96)*</td>
<td>2.08 (0.97)*</td>
</tr>
<tr>
<td><strong>Pain Tolerance (kg)</strong></td>
<td>4.70 (2.14)</td>
<td>3.00 (1.74)*</td>
<td>3.27 (1.38)*</td>
</tr>
<tr>
<td>VAS-Sensory</td>
<td>6.0 (1.5)</td>
<td>6.7 (1.9)*</td>
<td>6.2 (1.9)</td>
</tr>
<tr>
<td>VAS-Affective</td>
<td>3.7 (2.1)</td>
<td>5.7 (2.5)*</td>
<td>5.0 (2.4)*</td>
</tr>
<tr>
<td><strong>800 g stimulus</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAS-Sensory</td>
<td>2.8 (2.5)</td>
<td>5.6 (3.1)*</td>
<td>4.0 (2.9)*</td>
</tr>
<tr>
<td>VAS-Affective</td>
<td>2.0 (2.3)</td>
<td>5.0 (3.4)*</td>
<td>3.4 (2.9)*</td>
</tr>
<tr>
<td><strong>400 g stimulus</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAS-Sensory</td>
<td>1.6 (1.7)</td>
<td>4.1 (3.0)*</td>
<td>2.6 (2.3)*</td>
</tr>
<tr>
<td>VAS-Affective</td>
<td>0.9 (1.2)</td>
<td>3.6 (3.1)*</td>
<td>2.2 (2.2)*</td>
</tr>
</tbody>
</table>

*Difference between treated and untreated sites statistically significant (p < .05).

(1997) in their study of hypnotic analgesia during dressing changes in burn patients. Pain testing then resumed. Because the induction took approximately 20 minutes, the first 14 attention control subjects were given incidental material to read for 20 minutes until pain testing resumed. A dressing was placed over the site of capsaicin application for the 20-minute period in both groups of subjects.

**Pain testing during the intervention.** The next 13 subjects given RIA were not aroused from the hypnotic state until after pain testing had been completed (i.e., suggestions for relaxation and analgesia were given during pain testing). Pain testing started approximately 15 minutes into the hypnotic induction. Another 14 attention control subjects were given incidental material to read for 15 minutes until pain testing resumed. A dressing was placed over the site of capsaicin application for the 15-minute period in both groups of subjects.

**RESULTS**

**Effect of Capsaicin**

The pain-inducing effect of capsaicin was investigated in analyses of variance with a within-subjects factor of site (the untreated site, primary hyperalgesia at the site of capsaicin administration, and secondary hyperalgesia in nearby skin), and between-groups factors of intervention (RIA versus attention control) and timing of the final pain test (during versus after the intervention). Helmert contrasts were used to compare pain at the untreated site with pain at the two hyperalgesic sites and to compare pain at sites of primary and secondary hyperalgesia.

As shown in Table 1, pain thresholds and tolerance of mechanical stimulation were lower at sites of primary and secondary hyperalgesia than in untreated skin: for pain threshold, $F(1, 54) = 54.5, p < .001$;
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for pain tolerance, F(1, 54) = 79.3, p < .001. In addition, affective and sensory ratings of pain were greater at the hyperalgesic than untreated sites, F(1, 54) = 5.11 to 43.5, p < .05. Pain was greater at the site of primary than secondary hyperalgesia, F(1, 54) = 6.68 to 42.5, p < .05. Hence, capsaicin increased pain report for thresholds, tolerance, and ratings, particularly at the site of application.

The pain threshold and pain tolerance were lower for subjects whose final pain test was after the intervention than for subjects whose final pain test was during the intervention: for pain threshold, 1.65 versus 2.89 kg, F(1, 54) = 32.7, p < .001; for pain tolerance, 3.02 versus 4.40 kg, F(1, 54) = 12.3, p < .001. In addition, ratings of the intensity of ongoing pain after the application of capsaicin were higher for subjects whose final pain test was after the intervention than for subjects whose final pain test was during the intervention, 5.3 versus 3.8, F(1, 54) = 5.36, p < .05. Against this trend, however, affective ratings at the pain tolerance point were higher for subjects whose final pain test was during the intervention than for subjects whose final pain test was after the intervention, 5.4 versus 4.3, F(1, 54) = 4.13, p < .05. Neither the pain threshold, pain tolerance, nor pain ratings differed significantly between the RIA and attention control groups before the intervention.

Effect of RIA

Responses to RIA were investigated in ANOVAs containing between-groups factors of intervention (RIA versus attention control) and timing of the final pain test (during the intervention versus after the intervention). The analyses also had within-subjects factors of time (before the intervention versus the final pain test). Because preliminary analyses indicated that effects of RIA were similar at sites of primary and secondary hyperalgesia, pain ratings were averaged across sites.

As shown in Tables 2 and 3, ongoing pain and hyperalgesia decreased significantly from before the intervention to the final pain test; main effect for time for each variable, F(1, 54) = 6.21 to 105.5, p < .05; however, most of these decreases were similar in the RIA and attention control groups. In fact, the affective rating at the pain tolerance point was the only measure of pain to respond specifically to RIA: interaction between intervention and time, F(1, 54) = 7.28, p < .01; interaction between timing of the final pain test, intervention, and time, F(1, 54) = 5.46, p < .05. Investigation of the three-way interaction indicated that affective ratings of the final test of pain tolerance decreased more in the RIA group than in the attention control group for subjects who were tested during the intervention, t(25) = 3.57, p < .001 (see Table 3). Affective ratings did not differ between these two groups before the intervention but were lower in the RIA group than in the attention control group at the final test of pain tolerance, 3.3 ± 2.0 versus 5.6 ± 2.2, t(25) = 2.82, p < .01. Affective ratings did not differ between the RIA and matched attention control group at any
Table 2
Mean Ratings (SD) of Relaxation and Ongoing Pain for Attention Control and RIA Subjects Administered the Final Test Either During or After the Intervention

<table>
<thead>
<tr>
<th></th>
<th>Attention Control</th>
<th>Rapid Induction Analgesia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>Final Pain Test</td>
</tr>
<tr>
<td>Relaxation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final test during intervention</td>
<td>5.7 (2.0)</td>
<td>6.0 (2.5)</td>
</tr>
<tr>
<td>Final test after intervention</td>
<td>6.3 (2.0)</td>
<td>7.1 (2.4)</td>
</tr>
<tr>
<td>Ongoing Pain VAS-Sensory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final test during intervention</td>
<td>4.6 (2.3)</td>
<td>2.3 (2.0)*</td>
</tr>
<tr>
<td>Final test after intervention</td>
<td>4.7 (2.5)</td>
<td>1.3 (1.2)*</td>
</tr>
<tr>
<td>Ongoing Pain VAS-Affective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final test during intervention</td>
<td>3.8 (2.5)</td>
<td>2.0 (1.8)*</td>
</tr>
<tr>
<td>Final test after intervention</td>
<td>3.4 (3.0)</td>
<td>0.7 (0.9)*</td>
</tr>
</tbody>
</table>

Note: RIA = Rapid Induction Analgesia; VAS = Visual Analogue Scales.
*The intervention was either Attention Control or RIA.
†Change from before the intervention to the final pain test statistically significant (p < .05).
‡Increase greater in the RIA than the attention control group (p < .05).

stage for subjects who were tested after the intervention. As would be predicted from previous research (Price & Barber, 1987), decreases in affective ratings of the final test of pain tolerance were greater for subjects who were tested during the intervention than for subjects who were tested after the intervention, \( t(28) = 1.79, p < .05 \), one-tailed test; decreases did not differ significantly between the two attention control groups. However, it should be noted that the absolute value of affective ratings of the final test of pain tolerance (as opposed to decreases in these ratings) did not differ between the two RIA groups. The mean final rating for RIA subjects tested during hypnosis was 3.3 (SD = 2.0); for RIA subjects tested after hypnosis the mean was 3.5 (SD = 2.4).

Relaxation ratings increased to a greater extent in the RIA groups than in the attention control groups: interaction between intervention and time, \( F(1, 52) = 14.9, p < .001 \) (see Table 2). On average, relaxation ratings increased 2.8 ± 2.3 in the RIA groups, \( t(29) = 6.58, p < .001 \), but did not change significantly after the 15- to 20-minute interval in the attention control groups.
Table 3
Mean Change (SD) in Pain Scores From Before to After the Intervention, Averaged Over Primary and Secondary Sites

<table>
<thead>
<tr>
<th></th>
<th>Final Pain Test During Intervention</th>
<th>Final Pain Test After Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attention Control</td>
<td>RIA</td>
</tr>
<tr>
<td>Threshold (kg)</td>
<td>.34 (.81)</td>
<td>.33 (1.44)</td>
</tr>
<tr>
<td>Tolerance (kg)</td>
<td>.36 (1.30)</td>
<td>.42 (2.00)</td>
</tr>
<tr>
<td>Tolerance VAS-Sensory</td>
<td>-4 (1.6)</td>
<td>-1.3 (1.1)*</td>
</tr>
<tr>
<td>Tolerance VAS-Affective</td>
<td>-3 (1.9)</td>
<td>-2.6 (1.5)* +</td>
</tr>
<tr>
<td>800 g VAS-Sensory</td>
<td>-8 (2.0)</td>
<td>-1.8 (1.9)*</td>
</tr>
<tr>
<td>800 g VAS-Affective</td>
<td>-7 (2.2)</td>
<td>-2.0 (2.2)*</td>
</tr>
<tr>
<td>400 g VAS-Sensory</td>
<td>-8 (1.4)</td>
<td>-1.4 (1.0)*</td>
</tr>
<tr>
<td>400 g VAS-Affective</td>
<td>-8 (1.9)</td>
<td>-1.9 (1.6)*</td>
</tr>
</tbody>
</table>

Note: RIA = Rapid Induction Analgesia; VAS = Visual Analogue Scales.

*Change from before the intervention to the final pain test statistically significant (p < .05).
†Change greater in the RIA than the attention control group (p < .05).

RIA did not influence the pain threshold, tolerance levels, or pain ratings of ongoing pain or of standard mechanical stimuli that induced mild or moderate pain (see Tables 2 and 3).

Discussion

Our findings demonstrated that relaxation combined with hypnotic suggestions for analgesia had only a limited influence on pain ratings of mechanical stimulation of skin sensitized by the topical application of capsaicin. In particular, ratings of the unpleasantness of noxious mechanical stimulation for the final test of pain tolerance decreased more for subjects given RIA suggestions during pain testing than in the attention control group. However, ratings of less intense stimulation, ratings of ongoing pain, and pain thresholds and tolerance levels did not differ significantly between the RIA and attention control groups.

Contrary to expectations, RIA did not alter the intensity of the pressure stimulus required to achieve threshold or tolerance levels of pain, despite a specific reduction in affective pain ratings when RIA was administered during pain testing. We expected that ratings of pain at the pain tolerance point would remain fairly stable throughout the experiment (i.e., once pain had reached a certain level of discomfort, the subject would decide to terminate the pain stimulus). However, sensory and affective ratings at the pain tolerance point changed in parallel with increases and decreases in ongoing spontaneous pain, suggesting that subjects used criteria in addition to pain intensity and unpleasantness evoked by stimulation to decide when to terminate the stimulus. The
The unwillingness of subjects to tolerate painful stimulation despite a reduction in affective ratings of pain implies that implicit expectations of the effects of relaxation or hypnosis influenced reports of pain but had less impact on overt pain behaviour (i.e., deciding when to terminate the painful stimulus). Spanos and Hewitt (1980) postulated that demand characteristics could shape desired changes in pain perception, whereas Hilgard and Hilgard (1975) suggested that pain is processed during hypnosis despite the subject’s reported experience. The discrepancy between subjective reports and stimulus intensity at pain tolerance is consistent with Hilgard’s concept. On the other hand, pain tolerance does sometimes increase during hypnosis (Gelfand, 1964; Hilgard & Hilgard, 1975; McGlashan, Evans, & Orne, 1969; Spanos & Hewitt, 1980), implying that RIA had less effect on the degree of absorption, relaxation, or willingness to accept analgesic suggestions than other more traditional forms of hypnosis (see also Van Gorp, Meyer, & Dunbar, 1985). Alternatively, capsaicin may not have induced enough pain to motivate subjects to alter their pain experience during RIA. Consistent with this possibility, ongoing pain dissipated quickly after the capsaicin administration, as did pain induced by standard levels of mechanical stimulation. Furthermore, analgesic suggestions did not influence subjective ratings of pain from mechanical stimulation at levels below pain tolerance.

Our results are consistent with those of Price and Barber (1987) in that relaxation and hypnotic suggestions for analgesia were more effective when given during pain testing than when subjects were brought out of the hypnotic state, at least for decreasing the affective component of pain at the pain tolerance point. The difference in effectiveness did not seem to be due to differences in relaxation, because reports of relaxation were similar during and after RIA. Instead, bringing subjects back to a normal state of alertness apparently compromised the therapeutic effect of RIA. This interpretation must be treated with caution, however, because preliminary pain thresholds, tolerance, and pain ratings varied systematically (although not all in the same direction) between subjects whose final pain test was after the intervention and subjects whose final pain test was during the intervention. The source of this variation is uncertain but was possibly due to cohort differences in the criteria used to report pain. Affective ratings at the pain tolerance point decreased after the intervention in the RIA and matched attention control group and also decreased in the group that was tested during RIA; however, affective ratings persisted at high levels in the control group matched for subjects who were tested during RIA. The different outcomes may have been due
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...to different rating styles or to differences in the timing of data collection in the two control groups or may have been a spurious finding resulting from multiple statistical analyses. However, the similarity of the present findings to those of Price and Barber (1987) weakens these possibilities.

In contrast to decreases in affective ratings, the absolute magnitude of affective ratings of the final test of pain tolerance did not differ between the two RIA groups. It would be interesting to determine whether clearer differences would emerge between the two RIA protocols to a stronger pain stimulus than capsicain. In any event, it is unlikely that a floor effect limited decreases in affective ratings in either of the RIA groups at the final pain tolerance point, because ratings averaged around one third of full scale in both cases.

Measures of pain were consistently greater at the site of primary than secondary hyperalgesia. Despite this, affective ratings of pain decreased at both sites during RIA, consistent with the activation of a supraspinal mechanism that suppresses distress (e.g., distraction or reattribution of pain) (Kieman et al., 1995).

Suggestions given during RIA had more impact on the affective than the sensory component of pain both in the present study and in that of Price and Barber (1987). Relaxation during hypnosis appears to influence ratings of pain unpleasantness, whereas hypnotic suggestions for analgesia primarily target pain intensity (Dahlgren et al., 1995; Malone et al., 1989), possibly by activating an antinociceptive mechanism in the spinal cord (Kieman et al., 1995). The RIA protocol contains suggestions both for relaxation and analgesia, but the script focuses on feelings of comfort and relaxation. Hence, the relaxation aspects are emphasized more than the analgesic or hypnotic aspects per se. Indeed, self-reported relaxation increased substantially during and after RIA. The effect of the analgesic suggestions may have been stronger if greater emphasis had been placed on them during RIA or if participants had been selected on the basis of their hypnotic susceptibility (Price & Barber, 1987).

In conclusion, the implications of the present findings for RIA are that maintenance of hypnotic suggestions for analgesia may be more effective than post-hypnotic cues during painful procedures requiring mechanical stimulation of sensitized nociceptors, such as wound care and exercises after surgery (Mauer, Burnett, Ouellette, Ironson, & Dandes, 1999) or changing dressings in burn patients (Patterson, Everett, Burns, & Marvin, 1992; Wright & Drummond, 2000). When administered during such procedures, RIA helps to relieve anticipatory anxiety and distress as well as pain (Wright & Drummond, 2000). However, RIA does not appear to influence pain tolerance, suggesting that this brief hypnotic procedure impacts primarily on the subjective appraisal of pain rather than on nociceptive or behavioural aspects.
REFERENCES


Der Effekt von Rapid Induction Analgesia auf Subjektive Einschätzung von Schmerz und Schmerztoleranz

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L’effet de l’induction d’analgésie rapide sur les critères de la douleur subjective et la tolérance à la douleur

Bernadette R. Wright et Peter D. Drummond

Résumé: L’effet de l’analgésie d’induction rapide (RIA) sur la tolérance de douleur et les estimations de la douleur mécaniquement induite dans la douleur de l’avant-bras sensibilisé a été étudié chez 58 étudiants préparant une licence. Les suggestions post hypnotiques de relaxation et d’analgesie n’ont pas influencé des estimations ou la tolérance de douleur, mais les
estimations de relaxation se sont accrues après RIA. Quand des suggestions pour l’analgésie ont été faires dans l’exploration de la douleur, les estimations de douleur déplaisante au point de tolérance de douleur ont diminué davantage dans le groupe de RIA que dans le groupe de commande d’attention. Cependant, la RIA n’a pas influencé le seuil ou la tolérance de la douleur. On a conclu que la RIA était plus pertinente en réduisant les états subjectifs de douleur (en particulier la composante affective) qu’en modifiant la tolérance de douleur, et que l’entretien des suggestions hypnotiques était plus pertinent que des suggestions post hypnotiques de confort et de relaxation allégeant la composante affective de la douleur.

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El efecto de inducción rápida de analgesia en los informes subjetivos de dolor y la tolerancia al dolor

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Resumen: Investigamos el efecto de inducción rápida de analgesia (IRA, o RIA) en la tolerancia de dolor y los auto-informes de dolor inducido mecánicamente en un antebrazo sensible al dolor con 58 estudiantes. Las sugestiones posthipnóticas de relajación y analgesia no influyeron en la tolerancia o auto-informes de dolor, pero los reportes de relajación aumentaron después de IRA. Cuando dimos sugestiones de analgesia durante las pruebas de dolor, las puntuaciones de lo desagradable del dolor disminuyeron más en el grupo IRA que en el grupo control de atención. Sin embargo, IRA no influyó en la tolerancia o el umbral de dolor. Concluimos que IRA fue más eficaz para reducir los informes subjetivos de dolor (particularmente el componente afectivo) que en alterar la tolerancia al dolor, y que las sugestiones hipnóticas de bienestar y relajación durante la prueba fueron más eficaces que las sugestions posthipnoticas para aliviar el componente afectivo de dolor.