



The Effect of Music, Visual Imagery, and Guided Imagery on a Pain Pressure Task

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Introduction

- Certain personal factors or traits, such as low pain tolerance, can negatively influence injury recovery. Unfortunately there is limited research on psychological interventions to improve an individual's pain tolerance.
- The primary purpose of this research was to examine whether the use of mental imagery techniques, including music, and both guided verbal and visual imagery, can modify the perception of pain.

Design & Participants

	Experimental Conditions (4)				Totals
	Control	Music	Music Verbal	Music Visual	
N	19	21	20	16	76
Gender					
Male	11	12	10	12	45 (59.2%)
Female	8	9	10	4	31 (40.8%)
Athlete Status					
Yes	14	11	14	14	53 (69.7%)
No	5	10	6	2	23 (30.3%)
Exercise Habits (days per week)					
1/wk	0	1	0	0	1 (1.3%)
2-3/wk	3	4	8	3	18 (23.7%)
3-5/wk	11	11	8	5	35 (46.1%)
5-7/wk	5	5	4	8	22 (28.9%)
Used IM Before					
Yes	8	7	6	2	23 (30.3%)
No	11	14	14	14	53 (69.7%)
Ethnicity					
Black	1	6	4	2	13 (17.1%)
White	13	10	14	11	48 (63.2%)
Asian	1	0	0	0	1 (1.3%)
Hispanic	3	5	2	3	13 (17.1%)
Mid. East.	1	0	0	0	1 (1.3%)

Procedure

- This study was a pre/post repeated measures randomized experimental design with three treatment conditions (music only, music and verbal guided imagery, music and visual guided imagery) and one control condition.
- The pre-test included baseline BP, HR, Mental Imagery Questionnaire (Revised), and demographic questionnaire.
- The Forgione-Barber pain stimulator apparatus (pressure of 3kg) was placed on the middle digit of the left hand until the participant could no longer tolerate the pain or until ten minutes had passed. The participants self-reported pain tolerance, and perception of pain (1-10) and time tolerated (T1) was collected.
- The post-test included the delivery of nothing (control), music, verbal or visual guided imagery. The participants BP, HR, perception of pain (1-10), and time tolerated (T2) was collected.

Measures

- **Movement Imagery Questionnaire-Revised (MIQ-R, Hall & Martin, 1997).** The MIQ-R is a self-report psychological questionnaire that was designed to identify the imagery skill level of the respondent. The respondent is asked to physically perform a skill and then produce the same action in their mind, grading the ease of forming the image. Participants respond to the 8 items on an 8-point Likert scale and receive a total score between 8 and 56. The time it took to form the image was also measured.
- **Pain Rating Scale** (from From McCaffery, M. Pasero C; *Pain: Clinical manual, p. 63., 1999*) asks the participant to rate their pain by selecting a number from 0 (zero) to 10 (ten); no pain is a 0, and a 10 means the pain is as bad as it can be.

Hypotheses

- **Hypothesis I:** The visual imagery group will have the highest pain tolerance (time in seconds) as compared to the other three groups.
- **Hypothesis II:** Self-rating of pain will be correlated with pain tolerance score (time in seconds).
- **Hypothesis III:** Gender will have an effect on pain tolerance at time 1.
- **Hypothesis IV:** Athletic status will have an effect on pain tolerance at time 2.



Results

- Results revealed a main effect for time, indicating that the music with visual guided imagery group was able to tolerate the pain for a longer time than the control and music only groups during the post-test ($p < .007$).
- Individuals in the visual guided imagery condition also reported a significantly lower pain perception rating from pre- to post-test ($p < .001$).
- The data produced a ceiling effect for time (10 minute maximum) across all treatment/control groups; further analysis compared two groups, maxed out at 10 minutes and did not max out.
- Those who tolerated the pain pressure task for ten minutes were more likely to exercise or participate in sports regularly than those who stopped the task early ($p < .014$).
- In addition, those who lasted the maximum of ten minutes had lower pain ratings during the pre- and post-test ($p < .001$).

Discussion & Future Directions

- The main hypothesis was supported; the participants in the visual imagery group were able to withstand the pain applied by the Forgione-Barber pain stimulator apparatus for a longer period of time. However, it remains unclear what may be responsible for the difference between visual and verbal (auditory) processing systems and how they relate to pain perception, or disassociation.
- It is important to note that the music with visual imagery group ($n=16$) was characterized predominantly by male athletes (14 males, 2 females) and the majority had never used imagery prior to this investigation (2 yes, 14 no).
- Although gender differences were hypothesized, random distribution produced a grossly uneven number of males and females in each experimental condition; thus, the relationship between gender and time was not statistically examined.
- Self-ratings of pain tolerance did not significantly correlate with actual time in the pain pressure task; individuals may tend to overestimate their pain tolerance.
- Athlete status did not significantly effect time in the pain pressure task. Athletes from multiple sports, including team and individual sports, should be compared in subsequent research.
- These findings have potential implications for the use of imagery interventions with athletes or avid exercises that are rehabilitating sport-injury.