Predictors of placebo analgesia of pain and spinal nociception

Shreela T. Palit, MA, Yvette M. Güereca, MA, Bethany L. Kuhn, BS, & Jamie L. Rhudy, PhD
Department of Psychology, The University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104

Introduction

Placebo analgesia refers to a sham treatment that results in pain reduction and is mediated by expectations for reduced pain and conditioning (e.g., inert treatment + pain relief). Nevertheless, individual differences in placebo response exist, and identifying these predictors may improve pain treatments. Several predictors have been previously identified, including optimism (positive belief about future outcomes), expectation for pain relief, and reward motivation (e.g., drive towards a goal). However, these predictors have not been used together to determine which best predicts placebo response. Further, predictors of placebo analgesia of spinal nociception have yet to be examined. The current data were taken from a study of placebo analgesia that randomized 134 participants to 1 of 4 conditions: natural history (NH) control, conditioning (C), expectation (E), or expectation and conditioning (E+C). Suprathreshold stimulations were delivered to the ankle to evoke pain and the nociceptive flexion reflex (NFR; physiological measure of spinal nociception) before and after application of an inert cream. The E+C and E groups were told the cream was a “power placebo” while the NH and C groups told it was a “sensor” cream. Placebo response was defined as post-minus pre-change in pain and NFR. Participants rated their expectation for pain relief following cream application, completed the Life Orientation Test-Revised (LOT-R) and the Behavioral Inhibition System/Behavioral Approach System (BIS/BAS) scales to assess extraversion and motivation, respectively. For the purposes of the present study, the NH group was excluded and all placebo groups (N = 104) were examined together to identify predictors of placebo response.

Objectives

- To determine which predictor (expectation for pain relief, optimism, and motivation/drive) best predicts placebo response

Participants

- Healthy Participants: N = 104
- Participant Characteristics: White, non-Hispanic (81%), female (50%), employed (64%), average age = 35.36 years (SD = 2.55)
- Exclusion Criteria:
  - <18 yrs of age
  - Cardiovascular, neurological, circulatory problems
  - Chronic pain condition (e.g., back pain)
  - Current use of anxiolytic, antidepressant, and/or antihypertensive medication
  - Hispanic (81%), female (50%), employed (64%), average age = 35.36 years (SD = 2.55)

Experimental Procedure

- Participants were asked to rate what they believed their pain intensity would be after the cream was applied
- Placebo Analgesia: (Expectation and Conditioning) Calculated by: Average posttest pain intensity minus average pretreatment pain ratings
- NFR Placebo: (Expectation and Conditioning) Calculated by: Average posttest NFR magnitude minus average pretreatment NFR magnitude
- Expectations for pain relief was not a significant predictor of change in pain (p = .08)
- Drive was a significant predictor of change in pain (p = .04), such that higher drive was associated with greater post-pain (nocebo) response

Conclusions

- These findings suggest that expectations and drive can have different associations with spinal and supraspinal outcomes
- Drive is a significant predictor of nocebo response at the supraspinal level
- In contrast, expectation for pain relief was only a significant predictor of spinal level nocebo

Funding Source: This work was funded by a grant (HR12-100) from the Oklahoma Center for the Advancement of Science and Technology (OCAST)