Virtual Reality distraction vs post-hypnotic analgesic effects on thermal pain stimulation

VR
VIRTUAL REALITY
PAIN
CONTROL
HARBORVIEW BURN CENTER

www.VRpain.com

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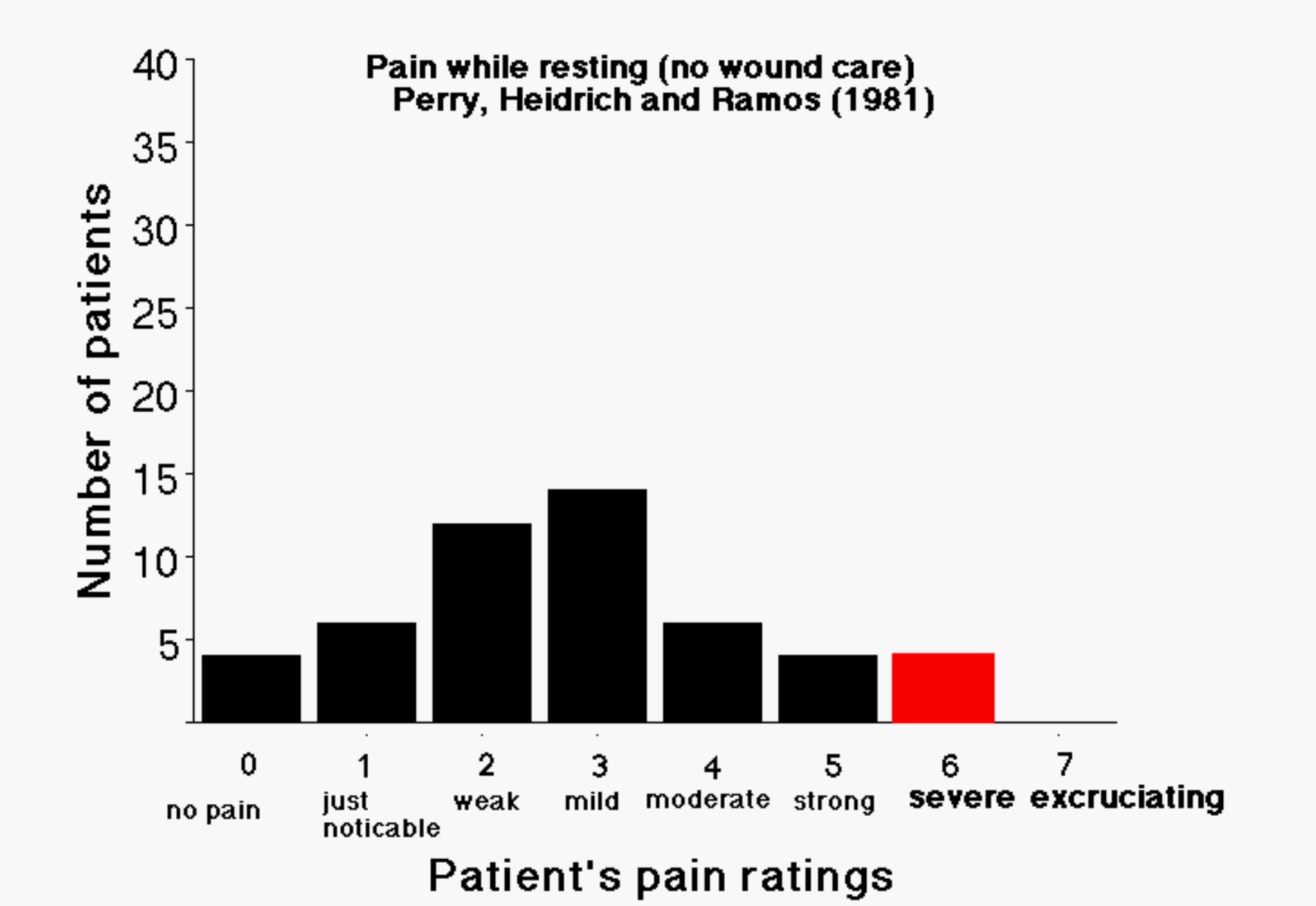
ACUTE PAIN

Short-lived.

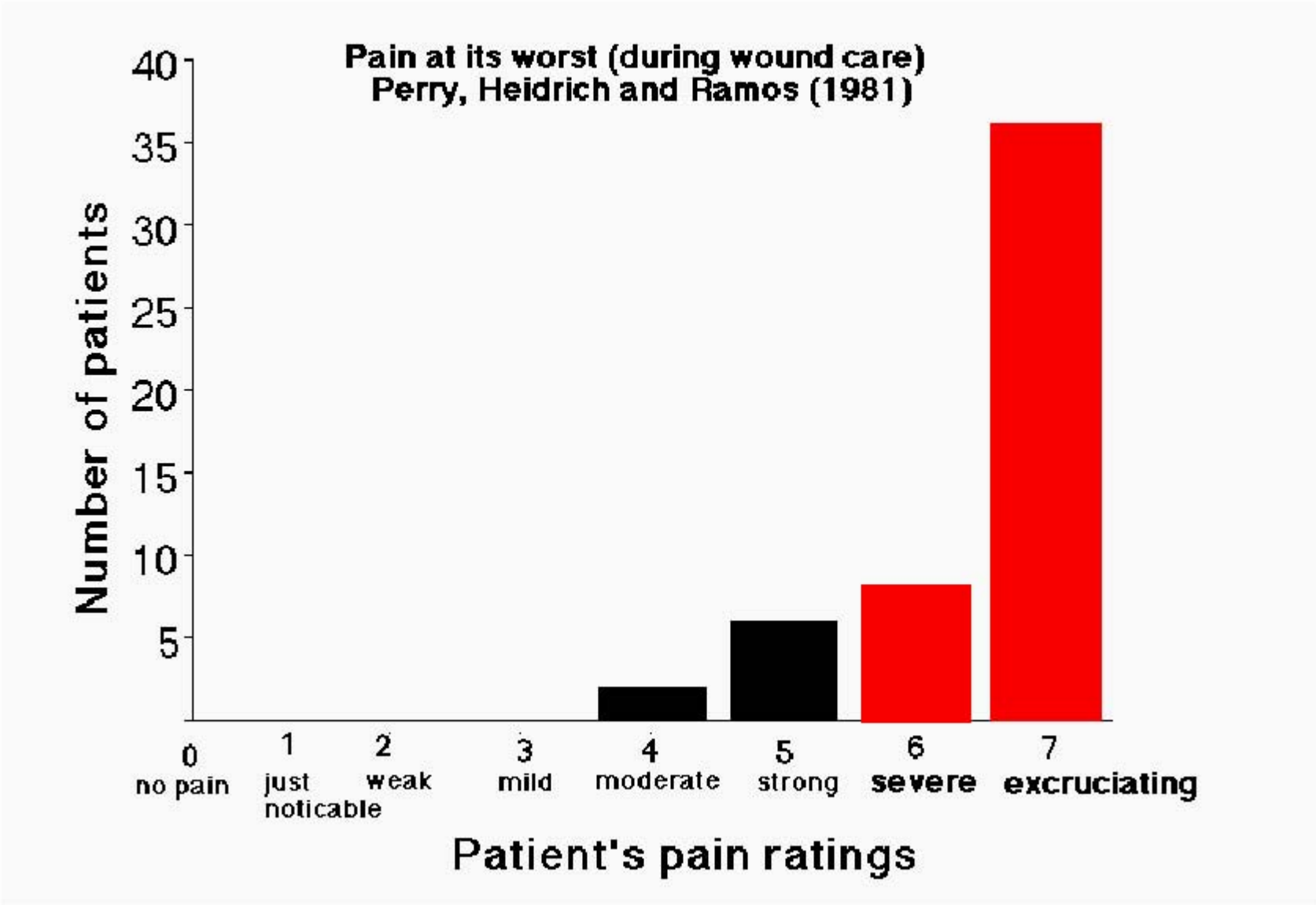
Some medical procedures associated with acute pain.

Opioids are effective in the treatment of acute pain. However …

Morphine controls pain well when patient is resting.



Morphine was inadequate for controlling pain during burn wound care.



NON PHARMALOGICAL APPROACH FOR REDUCING ACUTE PAIN

Distraction techniques

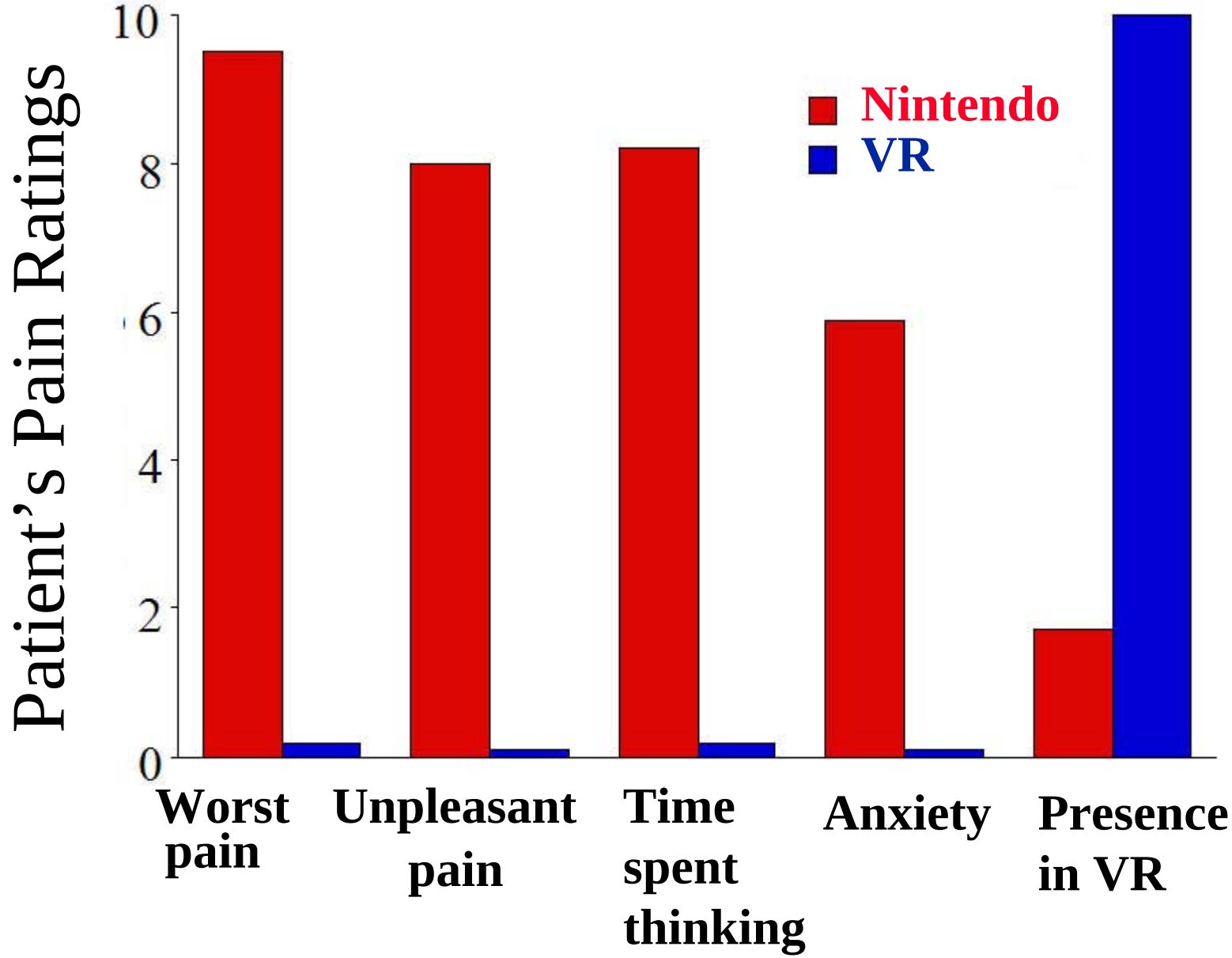
CBT

Hypnosis

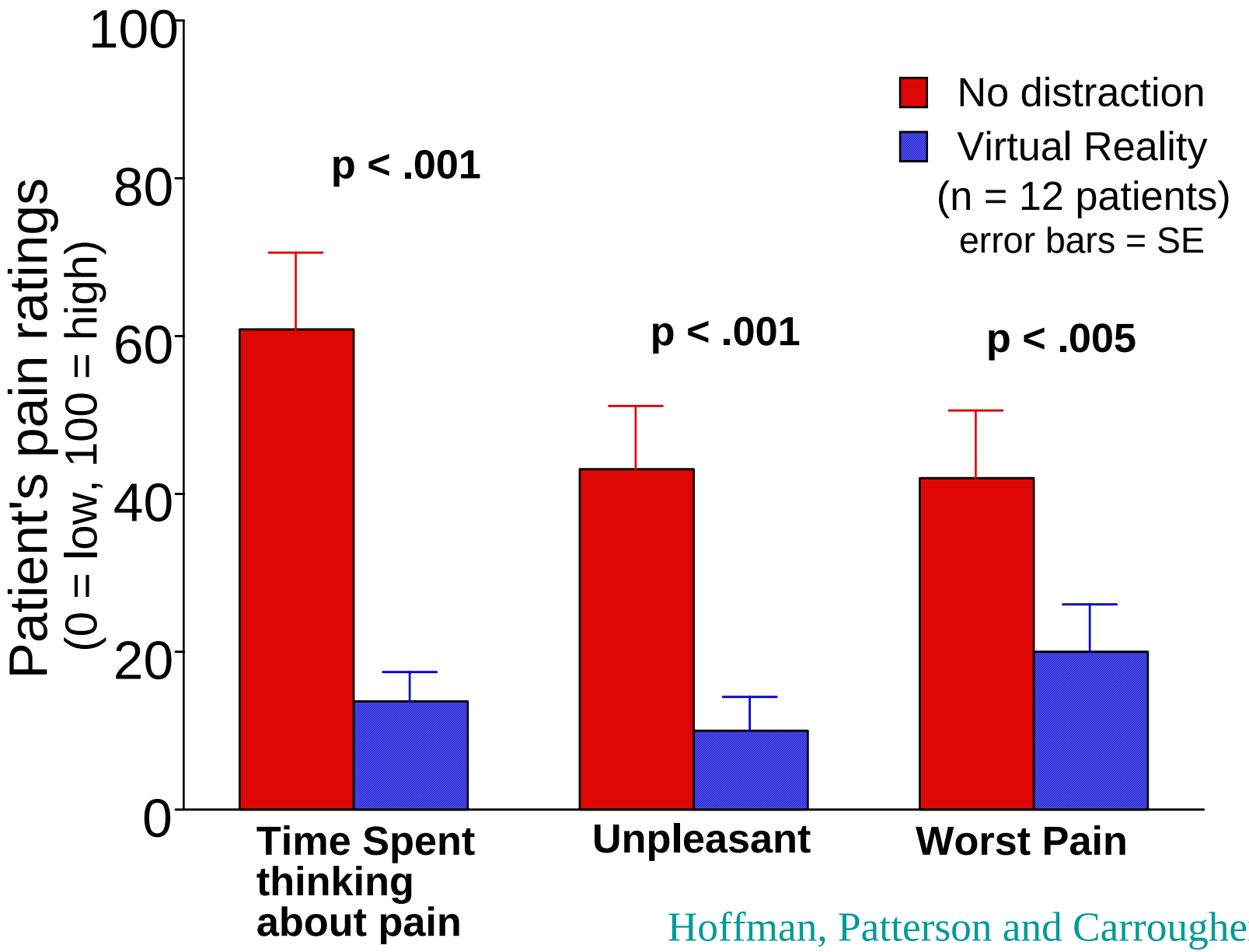
Virtual reality

VR pain distraction worked

Patient 1 showed large reductions in pain, strong VR presence

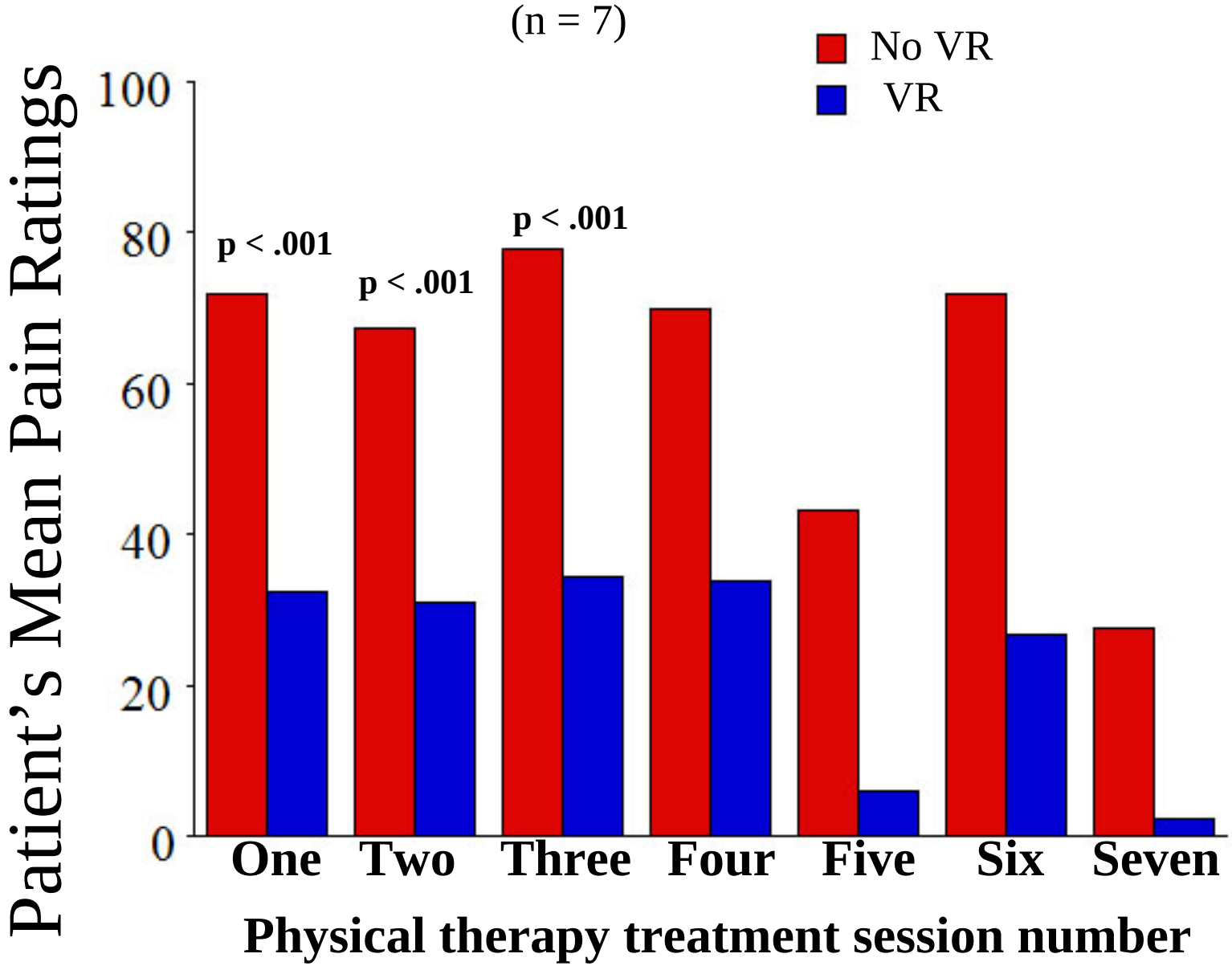


VR reduced pain during physical therapy for severe burns

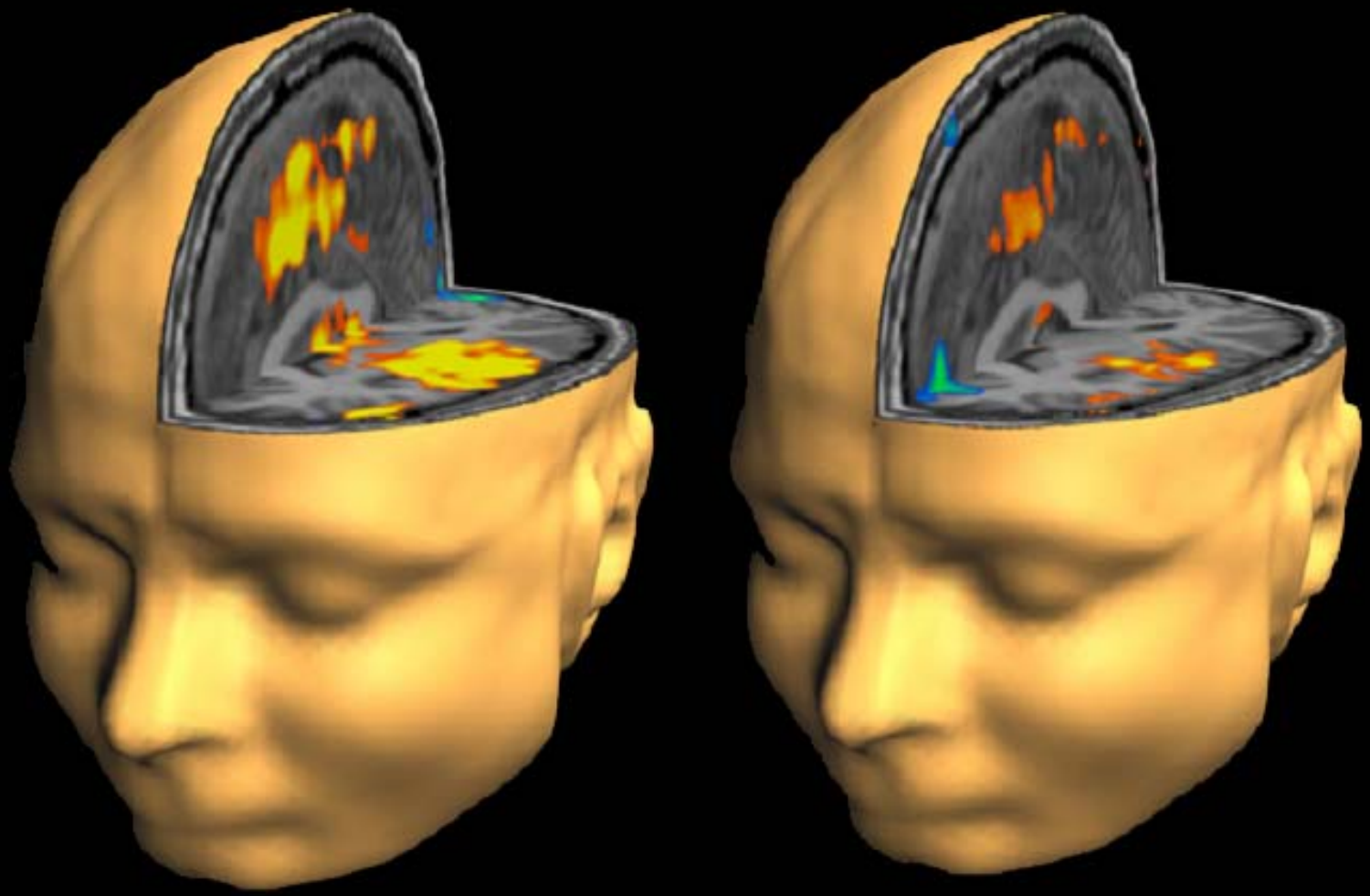


Hoffman, Patterson and Carrougher, 2000

VR reduced pain during multiple physical therapy sessions



VR significantly reduced pain-related brain activity during thermal pain (fMRI laboratory study).



Pain-related brain activity during No VR

During VR

SnowWorld reduces pain and fear of :

1) Burn patients
2) Dental patients
3) Urological cystoscopies
4) Cancer pain
5) Chronic pain

Laboratory studies with analog samples (HITlab)

- VR analgesia
- Attention played a role in VR analgesia
- VR analgesia influenced by sense of presence (High presence vs. Low presence)

PURPOSE

- To test the effectiveness of VR vs. Post-hypnotic analgesia.
- To test if the combination of VR + Post-hypnotic analgesia is more effective than those procedures alone.
- To test the effectiveness of VR and Post-hypnotic analgesia depending on hypnotizability.

Post-hypnotic vs. VR analgesia

Participants:

N = 99 undergraduate students UW

Mean Age = 19; range = 18 to 40.

Post-hypnotic vs. VR analgesia

Measures:

Primary outcome measure: Visual analog scales

Reduction on worst pain intensity experienced during the procedure.

Secondary outcome measures: VAS

Pain unpleasantness

Time spent thinking about pain

Amount of fun

Stanford Hypnotic Clinical Scale (Hildgard, 1994)

Post-hypnotic vs. VR analgesia

Experimental thermal pain model

Controlled thermal pain stimulation: Peltier thermode.

Highest temperature: 48 C

Mean: 46.4 C

Noxious heat stimulus was individually selected for each subject immediately prior to the study phase.

Between-subject design

Experimental conditions:

No Virtual Reality **No Hypnosis**	**No Virtual Reality** **Yes Hypnosis**
Yes Virtual Reality **No Hypnosis**	**Yes Virtual Reality** **Yes Hypnosis**

Randomly assigned

Double blind study

Between-subject design

Procedure:

Baseline pain stimuli and ratings (blind researcher)

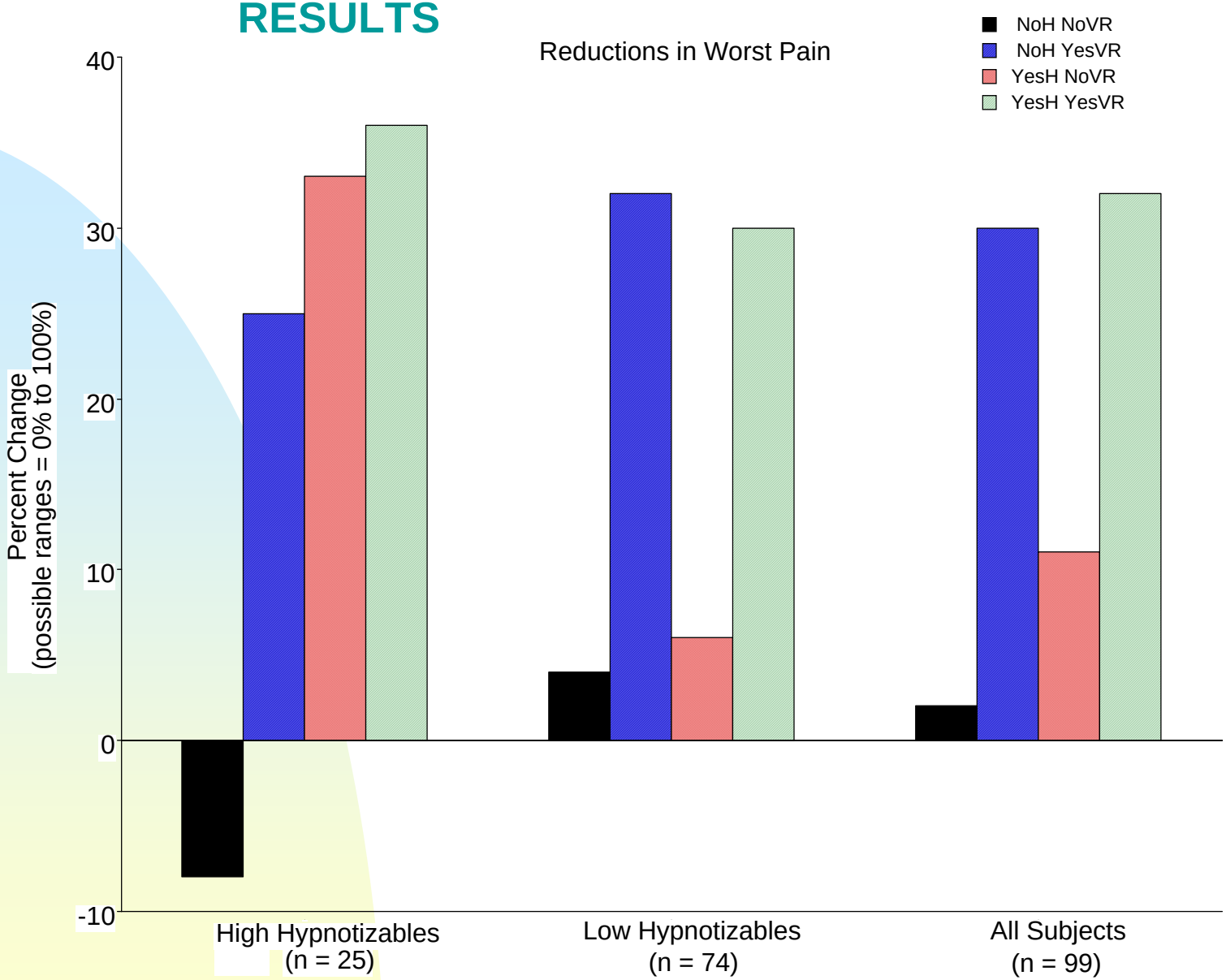
Listen to a tape with Hypnotic induction vs a control tape.

30 sec painful stimulation during VR or with no VR.

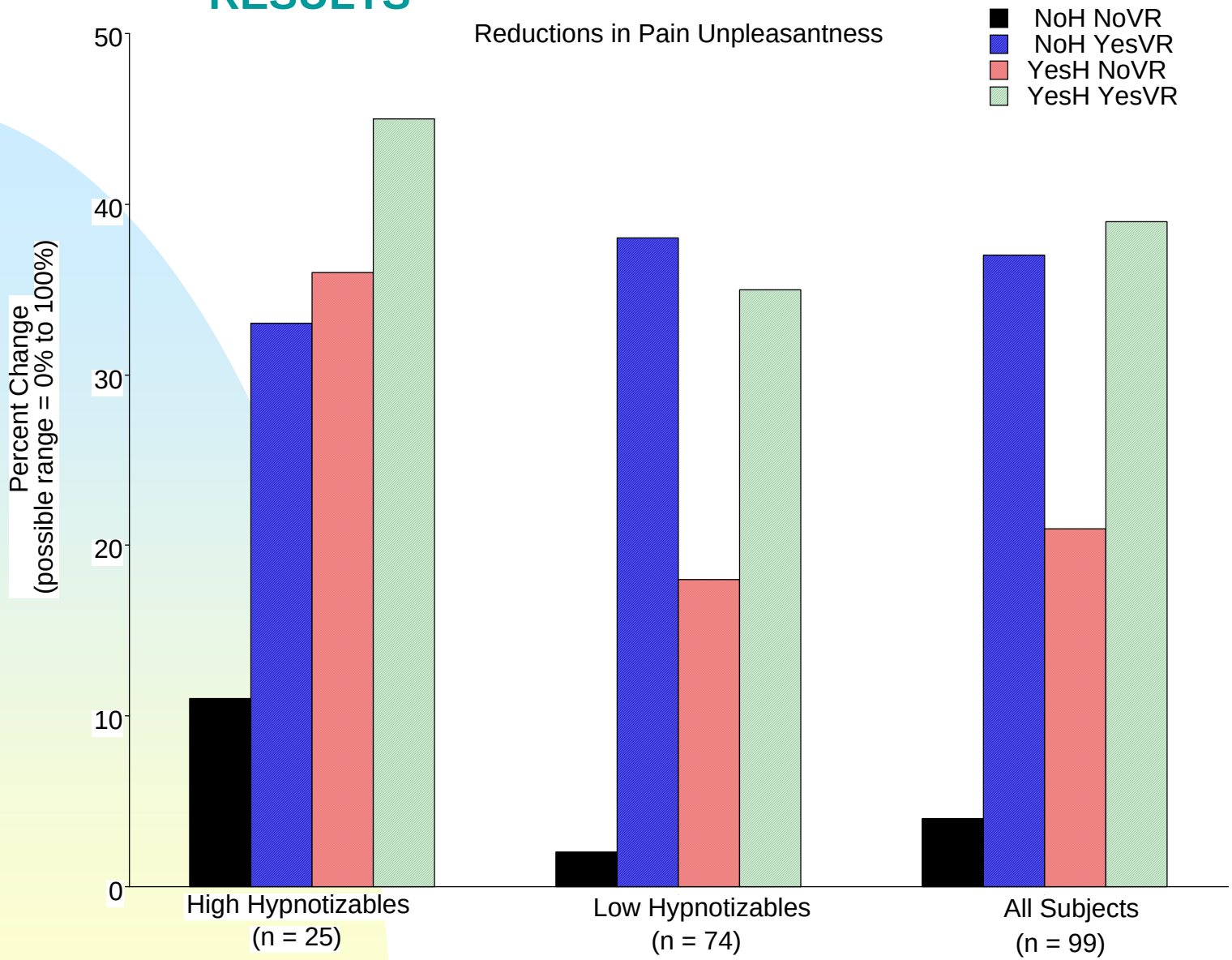
Administration of pain ratings (blind researcher)

Administration of Hypnotizability Scale (blind researcher)

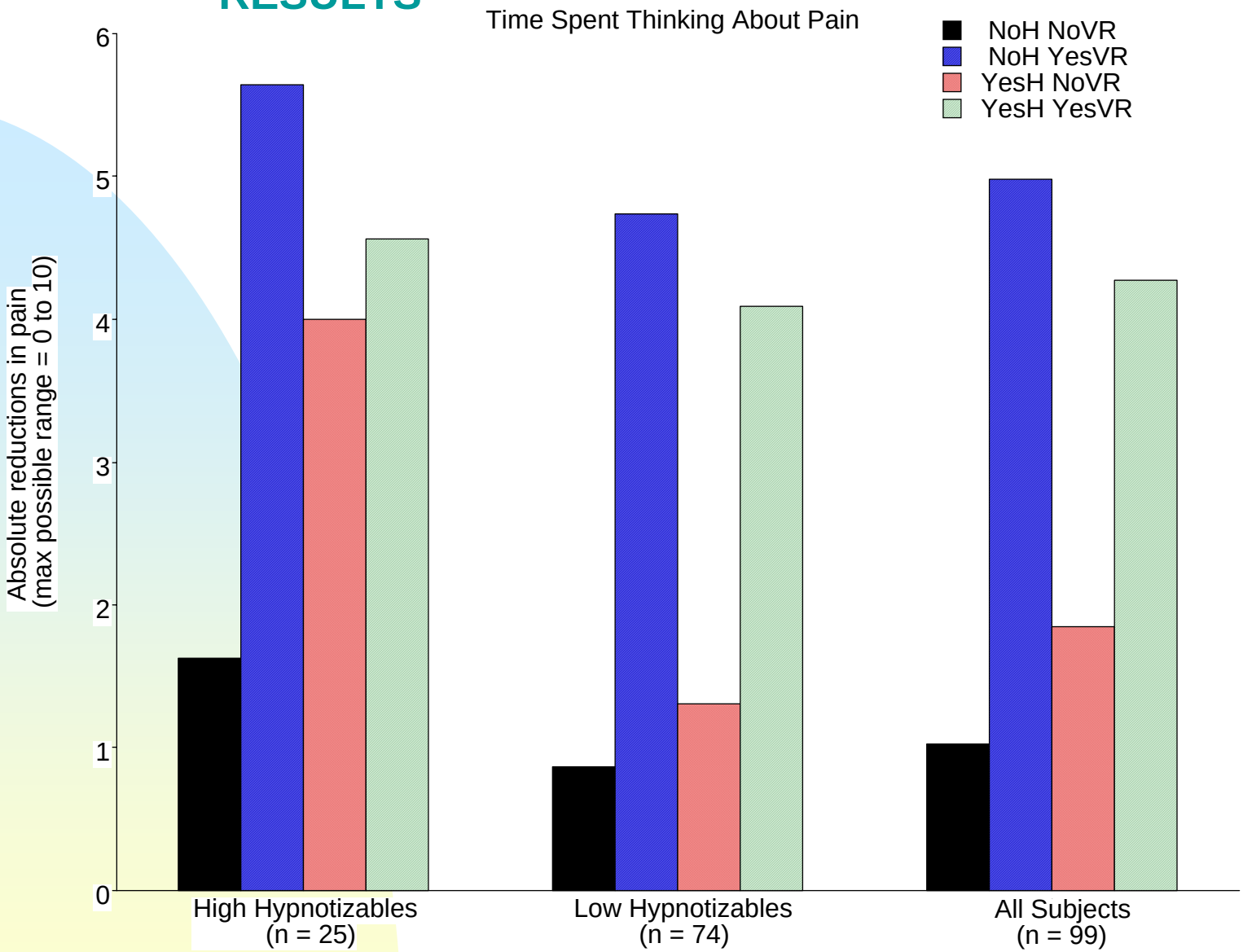
RESULTS


Reductions in Worst Pain
NoH NoVR
NoH YesVR
YesH NoVR
YesH YesVR
Percent Change
(possible ranges = 0% to 100%)
40
30
20
10
0
-10
High Hypnotizables
(n = 25)
Low Hypnotizables
(n = 74)
All Subjects
(n = 99)

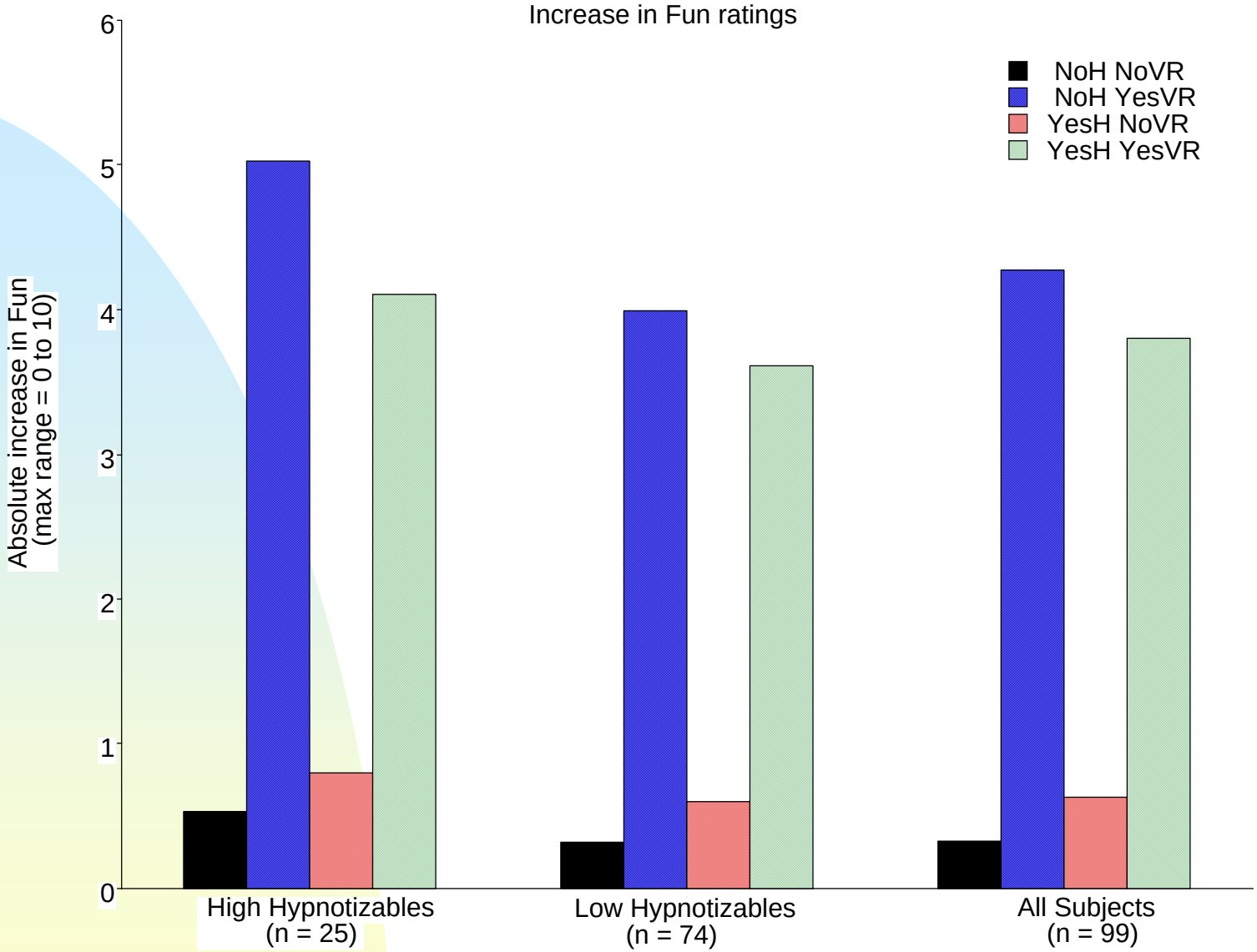
RESULTS


Reductions in Pain Unpleasantness
NoH NoVR
NoH YesVR
YesH NoVR
YesH YesVR
Percent Change
(possible range = 0% to 100%)
50
40
30
20
10
0
High Hypnotizables
(n = 25)
Low Hypnotizables
(n = 74)
All Subjects
(n = 99)

RESULTS


Time Spent Thinking About Pain
NoH NoVR
NoH YesVR
YesH NoVR
YesH YesVR
Absolute reductions in pain
(max possible range = 0 to 10)
0
1
2
3
4
5
6
High Hypnotizables
(n = 25)
Low Hypnotizables
(n = 74)
All Subjects
(n = 99)

RESULTS


Increase in Fun ratings
NoH NoVR
NoH YesVR
YesH NoVR
YesH YesVR
Absolute increase in Fun
(max range = 0 to 10)
0
1
2
3
4
5
6
High Hypnotizables
(n = 25)
Low Hypnotizables
(n = 74)
All Subjects
(n = 99)

CONCLUSIONS

Both VR and Hypnosis reduced acute pain

Virtual Reality showed a larger overall impact in all measures compared to Hypnosis

Hypnosis effective in high hypnotizable individuals

Virtual Reality + Hypnosis was not more effective than VR alone.

CONCLUSIONS

Limitations

Need of larger sample

We used post-hypnotic induction. Need to replicate results with other forms of hypnosis.

Need of replicate findings with clinical populations.

CONCLUSIONS

VR analgesia is demostrating that it could be a powerful technique in acute pain

Preliminary data supporting that VR analgesia could reach a larger number of people than other techniques like hypnosis

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