

The Effect of Positive Affect on the Memory of Pain

■ ■ ■ Przemysław Bąbel, PhD

■ ABSTRACT:

The aim of the study was to assess the accuracy of the memory of experimentally induced pain and the affect that accompanies experimentally induced pain. Sixty-two healthy female volunteers participated in the study. In the first phase of the study, the participants received three pain stimuli and rated pain intensity, pain unpleasantness, state anxiety, and their positive and negative affect. About a month later, in the second phase of the study, the participants were asked to rate the pain intensity, pain unpleasantness, state anxiety, and the emotions they had felt during the first phase of the study. Both recalled pain intensity and recalled pain unpleasantness were found to be underestimated. Although the positive affect that accompanied pain was remembered accurately, recalled negative affect was overestimated and recalled state anxiety was underestimated. Experienced pain, recalled state anxiety, and recalled positive affect accounted for 44% of the total variance in predicting recalled pain intensity and 61% of the total variance in predicting recalled pain unpleasantness. Together with recent research findings on the memory of other types of pain, the present study supports the idea that pain is accompanied by positive as well as negative emotions, and that positive affect influences the memory of pain.

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From the Jagiellonian University,
Institute of Psychology, Pain Research
Group, Kraków, Poland.

Address correspondence to
Przemysław Bąbel, PhD, Jagiellonian
University, Institute of Psychology,
Pain Research Group, ul. Ingardena
6, 30-060 Kraków, Poland. E-mail:
przemyslaw.babel@uj.edu.pl

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There is mounting evidence that people do not remember pain accurately and that their recall of chronic (Broderick et al., 2008; de Wit et al., 1999; Stone, Schwartz, Broderick, & Shiffman, 2005) and acute pain (Eli, Schwartz-Arad, Baht, & Ben-Tuvim, 2003; Everts et al., 1999; McNeil et al., 2011) is exaggerated. Some studies have found that the recall of acute pain may be underestimated (Bąbel, 2016; Bruck, Ceci, Francoeur, & Barr, 1995; Eli, Baht, Kozlovsky, & Simon, 2000), whereas others have found that past chronic pain (Bolton, 1999; Lefebvre & Keefe, 2002) and acute pain (Bąbel, 2014, 2015; Terry, Niven, Brodie, Jones, & Prowse, 2007) may be remembered accurately.

Many factors have been found to influence the memory of different types of pain, such as the experienced pain (Bąbel, 2015, 2016; Bąbel, Pieniżek, & Zarotyński, 2015), the peak and end of the pain (Chajut, Caspi, Chen, Hod, & Ariely, 2014; Redelmeier & Kahneman, 1996; Stone, Broderick, Kaell, DelesPaul, & Porter, 2000), the recall delay between the experience of pain and its recollection (Broderick et al., 2008; Feine, Lavigne, Thuan Dao, Morin,

& Lund, 1998; Gedney, Logan, & Baron, 2003), and the level of pain experienced while recalling prior pain (Bryant, 1993; Feine et al., 1998; Holroyd, France, Nash, & Hursey, 1993).

Psychological variables that also are related to the memory of pain include expectations about pain (De Pascalis, Chiaradia, & Carotenuto, 2002; Gedney et al., 2003; Price et al., 1999), negative affect (Babel, 2014, 2016; Babel et al., 2015), distress (Chen, Zeltzer, Craske, & Katz, 2000; Everts et al., 1999; Jamison, Sbrocco, & Parris, 1989), state anxiety (Babel, 2014, 2015; Babel et al., 2015), trait anxiety (Babel & Krzemień, 2015; Kent, 1985; Rocha, Marche, & von Baeyer, 2009), pain catastrophizing (Lefebvre & Keefe, 2002; Noel, Rabbitts, Tai, & Palermo, 2015), and positive affect (Babel, 2014, 2015; Babel et al., 2015).

The memory of past pain has been found to influence the subsequent experience of pain (Chen et al., 2000; Gedney & Logan, 2006; Noel, Chambers, McGrath, Klein, & Stewart, 2012a) and to play a role in the development of chronic pain (Tasmuth, Kataja, Blomqvist, von Smitten, & Kalso, 1997; Tasmuth, von Smitten, Hietanen, Kataja, & Kalso, 1995). It also has been found that memories of painful medical procedures can influence the willingness of patients to undergo future painful medical procedures (Redelmeier, Katz, & Kahneman, 2003). Similarly, memories of painful experimental procedures can influence the subsequent decisions of experimental subjects regarding pain stimuli (Kahneman, Fredrickson, Schreiber, & Redelmeier, 1993). Moreover, diagnoses and decisions about treatment are often made on the basis of how a patient describes both present and past pain. Memory of pain is often implied in the pain measures used in pain diagnosis and research. Assessments of the effectiveness of treatments for pain are based on patient reports of relief from pain, assuming that relief represents the difference between present (posttreatment) and past (pretreatment) pain. Previous studies have found that patients who recall their pain as being more intense than it actually was reported greater pain relief after active treatments and placebos (De Pascalis et al., 2002; Feine et al., 1998; Price et al., 1999); however, patients who reported complete pain relief during the pain experience were unable to recall this pain relief 6 months later (Everts et al., 1999). Thus, the accuracy of the memory of pain is an important issue in clinical practice and research on pain.

While only a few studies on the memory of experimental pain have been conducted, so far, their results are no less diverse than the studies cited above. Whereas some studies have found that the recall of

experimental pain is overestimated (De Pascalis et al., 2002; Gedney & Logan, 2004, 2006; Price et al., 1999), others have found it is underestimated (De Pascalis, Cacace, & Massicolle, 2008; Fors & Götestam, 1996; Rode, Salkovskis, & Jack, 2001), and still others have found that experimental pain is remembered accurately (Badali, Pillai, Craig, Giesbrecht, & Chambers, 2000; Hovasapian & Levine, 2016; Jantsch et al., 2009; Roche & Gijsbers, 1986; Terry et al., 2007). Thus, it is not possible to draw any firm conclusions concerning the accuracy of experimentally induced pain.

The main aim of the current study was to assess the accuracy of the memory of experimentally induced pain 1 month after the pain experience. Moreover, to the best of our knowledge, accuracy of affect that accompanied the experimentally induced pain has not been studied previously. Thus, the second aim of the study was to assess the accuracy of the memory of the affect accompanying pain experience. Little is known about the factors contributing to the memory of experimentally induced pain. In particular, to the best of our knowledge, the role of positive affect has not been studied so far in the context of the memory of experimentally induced pain. Thus, the third and final aim of the study was to investigate several variables that may influence the memory of pain, including positive affect.

MATERIALS AND METHODS

Participants

A total of 62 female volunteers participated in the study. They were healthy and were not taking any medication. The mean age of the participants was 20.38 (± 1.27) years. They were solicited to participate in a two-part study of pain mechanisms. The first phase of the study began when individuals agreed to participate, and the second phase began roughly a month after the first phase. During the first phase, the participants were told that they would receive three electrical pain stimuli, but they were not told that the second phase would measure their memory of pain. They were informed they could end their participation in the study at any point without giving a reason. All the volunteers gave their informed written consent to participate in the experiment. The study protocol was approved by the Research Ethics Committee of the Institute of Psychology of Jagiellonian University.

Pain Stimulation

Electrocutaneous pain stimuli were delivered to the inner side of the nondominant forearm by two durable

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