The need for diversity in research on facial expressions of pain

Letter to Editor:

Facial expressions of pain facilitate social communication and are often incorporated in clinical pain assessments, including in patients with acute and chronic pain, infants, critically ill nonverbal patients, and cognitively impaired patients. Researchers have begun using criteria such as the Facial Action Coding System to systematically measure facial responses to pain in the laboratory and clinic. Kunz et al. recently performed a much-needed systematic review of this field, which highlights a promising consistency across published data sets. The authors comprehensively reviewed facial movements based on Facial Action Coding System and identified 4 main clusters of action units that occur most frequently and move more in pain conditions compared with baseline in acute and chronic pain: AU4 (brow lower), AU6_7 (cheek raise/lid tighten), AU9_10 (nose wrinkle/lip raise), and AU25_26_27 (opening of the mouth). This provides key regions of interest for medical providers and future studies to analyze when assessing pain. Importantly, the authors also acknowledge variability in the coactivation of these units across studies, and ultimately advise that doctors evaluate pain expression on an individual basis.

The systematic review also highlights a more unfortunate area of consistency within the field of facial expression research, which is potential sample homogeneity and omission of important demographic information. Eighty-seven percent of the articles in the review were conducted in either Canada or Germany. Although most articles reported the age and sex of their samples, nearly all articles omitted information on race and ethnicity, leaving open the question of whether the findings reflect facial expressions of pain in White males and females from Canada and Germany, or people in general. Only 3 articles mentioned anything pertaining to ethnic or cultural background or socioeconomic status and none evaluated the potential influence of these factors or intersectional identity in statistical analyses. It is particularly important to consider the role of ethnicity in clinical and basic research because ethnic minorities experience increased pain in laboratory and clinical settings, and increased postoperative pain, and receive decreased care.

For example, Black American patients experience increased pain and receive less opioid treatment compared with White Americans after motor vehicle collisions. If pain researchers do not include sample demographics in publications, we run the risk of perpetuating disparities and building a science of pain based on homogeneous samples.

Although researchers have begun to look for mechanisms underlying health inequities in pain, a lack of diverse samples and over-reliance on White stimulus sets has limited researchers’ ability to evaluate whether facial expressions or their assessment contribute to disparities in pain. One recent study found that White participants require more evidence to recognize pain in Black American faces compared with White American faces. This in-group bias parallels a large literature on biased emotion perception in the United States and directly links with the pain disparities mentioned above. Furthermore, it is still unknown if there are cultural or ethnic differences in the expression of pain. Recent evidence indicates cultural differences in the association between facial responses and basic emotions, despite long-held assumptions that emotional expressions are universal. Pain researchers should increase efforts to include ethnically and culturally diverse samples to evaluate whether similar variations are seen in pain expressions.

We feel that the review by Kunz et al. highlights the need for pain researchers to (1) collect diverse samples in studies of facial responses and other pain assessments, (2) report sample demographics, and (3) formally consider ethnic and cultural influences on pain and pain-related responses. If we continue to use homogeneous samples, we are likely to introduce further biases in pain assessments, particularly as we become more dependent on automated technology and algorithms. Such biases have already been documented in image-based assessments in other fields, including medical decision-making, and we fear it is only a matter of time before they are identified in automated tools for pain. However, if we train these new algorithms with diverse samples, then we have the opportunity to create machines that exhibit less bias than humans. This is a critical period and we urge the research community to note these gaps, report sample demographics, and avoid homogeneous studies that may further the crisis of health disparities in pain.

Conflict of interest statement

The authors have no conflict of interest to declare.

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Reply to Dildine and Atlas

Letter to Editor:
We appreciate the response by Dildine and Atlas4 to our recently published review article on facial muscle movements accompanying the experience of pain.5 As the 2 authors correctly point out, most of the evidence on facial expressions of pain stems from research conducted either in Canada or in Germany. And although attempts for diversity were made in these studies, by including participants of varying age groups,6 of varying degrees of cognitive functioning,1,4,10 both men and women7 as well as pain patients and pain-free individuals,12 the participants were mainly Caucasian. Consequently, as the authors correctly state, our knowledge on facial expressions of pain is mostly based on “facial expressions of pain in White males and females from Canada and Germany.”13 This is indeed a shortcoming that might limit the generalizability of the findings on facial expressions of pain.

Based on previous evidence, it seems less likely that the type of facial muscle movements occurring during pain will vary across ethnic and cultural groups. Given that a similar subset of pain-indicative facial muscle movements can be found in newborns5,12,13 and in genuinely blind individuals14 suggests that this subset of muscle movements—composed of contraction of the eyebrows, contraction of the muscles surrounding the eyes, nose wrinkling/lip raise, and opening of the mouth15—is largely hardwired. However, the intensity to which these pain-indicative facial responses are displayed can be expected to vary substantially among different ethnic and cultural groups. The intensity of facial expressions of pain is governed by learned social display rules that determine when, where, and how we should facially express or not express our pain.5 Thus, ethnic and cultural differences in social display rules will result in variations in facial expressiveness.

It is crucial to investigate ethnic and cultural differences in facial expressions of pain, given that facial expressions are of great clinical relevance in pain diagnostic and pain treatment. Especially for nonverbal individuals (eg, individuals with dementia), facial expression is one of the key indicators of pain.11 Not knowing how ethnic and cultural aspects might impact the facial expression of pain could lead to an overtreatment or undertreatment of pain. Thus, we echo the authors’ call for more diversity in facial expression of pain research. This diversity should not only include the encoding side (the person expressing pain) but also the decoding side (the observer) of the facial expressiveness of pain process.

Conflict of interest statement
The authors have no conflict of interest to declare.

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