Received: 24 April 2022 | Revised: 3 October 2022 | Accepted: 30 October 2022

DOI: 10.1111/jasp.12941

ORIGINAL ARTICLE

Journal of Applied Social Psychology WILEY

# The affiliative power of others' pain online

Jessie Mitchell[1] | Stefano Occhipinti[1,2] | Megan Oaten[1]

[1]School of Applied Psychology, Griffith University, Mount Gravatt, Queensland, Australia

[2]Department of English and Communication, Hong Kong Polytechnic University, Hung Hom, Hong Kong

**Correspondence**
Jessie Mitchell, School of Applied Psychology, Griffith University, 176 Messines Ridge Rd, Mount Gravatt, Queensland 4122, Australia.
Email: jessie.mitchell@alumni.griffithuni.edu.au

**Funding information**
Griffith University

## Abstract

Pain is rarely suffered alone. In contemporary online contexts, publicly shared pain can command the collective attention of hundreds, even millions of people. We sought to explore the possibility that collectively attending to others' pain promotes affiliation among those with whom it is attended online and identify the mechanisms that mediate these effects. Across two experimental studies, utilizing independent group designs, physically dispersed undergraduate students attended to real-world videos depicting either physical, social, or no-pain online. In Study 1 ($N = 74$, 66.22% female, $M_{age} = 25.31$ years, $SD_{age} = 6.81$ years), we found evidence for the phenomenon of pain collectively attended to online, with online videos depicting physical and social pain eliciting stronger perceptions of collective attention than the non-painful online video. In Study 2 (Time 1: $N = 185$, 75.14% female, $M_{age} = 22.62$ years, $SD_{age} = 7.44$ years; Time 2: $N = 91$, 72.53% female, $M_{age} = 23.32$, $SD_{age} = 8.19$), we subsequently found collectively attending to others' physical and social pain online indirectly promoted cohesion, interpersonal closeness, and desire to affiliate among participants through perceived emotional synchrony. This pattern of indirect effects was found immediately after collective attention to painful online content (Time 1) and at 1-week follow-up (Time 2). Although preliminary, our findings increase practical understanding of how shared pain can be harnessed to bond physically dispersed individuals together online, the implications of which we discuss in the context of the COVID-19 pandemic.

## 1 | INTRODUCTION

With over three billion people using social media daily (Brady et al., 2020) and increased pressure for physical distancing (Marzouki et al., 2021; Palamar & Acosta, 2021; Wong et al., 2021), online technologies have transformed the way humans interact with one another. As a consequence, online environments provide unique public spaces for manifesting personal experiences of pain. Pain that was formerly privately manifested and commanded only the attention of close others is now also shared publicly online, where it interrupts, distracts, and demands the collective attention of sometimes millions of online users. On social media, for example, it is commonplace for users to disclose serious health issues (Chou et al., 2011; Gonzalez-Polledo & Tarr, 2016; Moreno et al., 2011; Sannon et al., 2019), mourn in public exchanges of grief (Döveling & Wasgien, 2015; Egnoto et al., 2014; Giaxoglou et al., 2017; Refslund Christensen & Gotved, 2014), and break news of mass suffering (e.g., natural disaster, pandemic, acts of terror, and political upheaval; Hermida, 2014; Neubaum et al., 2014; Y. Song & Xu, 2019).

There is some evidence to suggest that collective attention to others' pain shared in these ways influences relations among co-attendees. During a collective attention state, individuals who

register simultaneous attention to a common manifestation of pain do so from a first-person-plural perspective or the perception that *we are attending* together (Shteynberg, 2015). Collective attention online is said to occur due to the perception of synchronous co-attention (Shteynberg et al., 2016), characterized by growing accumulated focus on a specific stimulus or topic (Bagrow et al., 2011; De Domenico & Altmann, 2020). With continued online immersion, the potential for collectively attended pain is unprecedented. One possibility is that this unique form of shared experience promotes affiliation among co-attendees. Here, we use the term affiliation to refer to attitudes and behaviors involved in forming interpersonal bonds between individuals (Feldman, 2012; Merriam-Webster, n.d.). The aim of our work is to explore the emergence of affiliative attitudes and behaviors between those who collectively attend to others' pain online, specifically, and to understand the mechanisms that mediate affiliative responses. We propose that such an effect has the potential to promote large-scale social bonding even in times of public uncertainty, disaster, and conflict.

## 1.1 | Pain as social glue

Generally speaking, shared experiences facilitate liking (Pinel et al., 2006), interpersonal closeness (Haj-Mohamadi et al., 2018; Wolf et al., 2016), and conformity (Pinel et al., 2010). Interestingly, shared experiences appear to be particularly powerful in facilitating interpersonal affiliation when they involve pain. Much of the existing support for this phenomenon extends from instances where physical pain is experienced personally or vicariously attended to during collective rituals in face-to-face contexts. However, there is some evidence to indicate the affiliative power of collectively attending to others' physical and social pain in everyday, virtually mediated contexts.

### 1.1.1 | Physical pain

Physical pain is widely defined as an "unpleasant sensory and emotional experience arising from actual or potential tissue damage, or described in terms of such damage" (The International Association for the Study of Pain Task Force on Taxonomy, 1994; p. 210). Numerous anecdotal accounts exist of camaraderie among soldiers wounded in war (Elder & Clipp, 1989; Whitehouse et al., 2017), athletes bonded within painful sporting contexts (Downey, 2007; Turner & Wainwright, 2003; Whitehouse et al., 2017), and fusion among survivors of large-scale disasters (Drury et al., 2009; Rodríguez et al., 2006; Vezzali et al., 2016). Corroborating empirical evidence shows that individuals who share physically painful experiences as compared to non-painful experiences bond to a greater extent, cooperate more (Bastian, Jetten & Ferris, 2014), and participate in more supportive interactions (Bastian et al., 2018). These effects are reported among strangers and are, therefore, separate from other known group processes related to pain for the group (Aronson & Mills, 1959; Olivola & Shafir, 2013) and common fate (Brewer & Kramer, 1986; Campbell, 1958).

In addition, long-standing anthropological theory (Durkheim, 1915; Morinis, 1985; van Gennep, 1960), historical evidence (Atkinson & Whitehouse, 2011; Sosis & Bressler, 2003) and recent experimental field studies (Bulbulia et al., 2013; Mitkidis et al., 2017; Xygalatas et al., 2013) show that physically painful ritual practices serve the evolutionary purpose of promoting mutually enhancing cooperative commitments among both ritual performers and ritual attendees. Field studies report that performers and attendees of physically painful rituals express more inclusive social identities and donate significantly more to collective causes than performers of low-intensity rituals, with perceived pain positively related to donation (Xygalatas et al., 2013). Field studies also report that physically painful rituals promote honesty among ritual attendees but not ritual performers (Mitkidis et al., 2017). These findings suggest that merely attending to others' physical pain is sufficient to act as a social glue in ritual contexts, separate from the dissonance-motivated (Aronson & Mills, 1959; Festinger, 1959) or meaning-seeking (Dakin et al., 2021) commitment of ritual performers. Admittedly, collective rituals exist within a cultural context, elicit long-standing aspects of group life, and have traditionally required physical gathering, limiting the extent to which causal claims can be made. Still, it is plausible that even outside of ritual contexts, individuals who collectively attend to others' physical pain feel more connected to one another than individuals who collectively attend to similar non-painful experiences. In support of this proposition, some preliminary evidence suggests that shared emotionally dysphoric experiences promote strong group cohesion among co-attendees in contexts that are not only non-ritualized but also virtual (Buhrmester et al., 2018).

### 1.1.2 | Social pain

Beyond a physically mediated phenomenon, pain is a largely subjective experience that can also arise from stimuli unrelated to nociception. For example, social pain has been defined as an unpleasant emotional experience arising from perceived distance from desired relationship partners or groups (Eisenberger & Lieberman, 2004; MacDonald & Leary, 2005), deemed painful due to the importance of social connection for human survival (Baumeister & Leary, 1995). Physical and social pain are purported to overlap, with commonalities found in their neurological underpinnings and physiological and psychosocial outcomes (DeWall et al., 2010; Eisenberger & Lieberman, 2004; Eisenberger et al., 2003, 2006, 2012a, 2012b, 2015; Lieberman & Eisenberger, 2006; Panksepp et al., 1980; Riva et al., 2011).

Several accounts exist of camaraderie among soldiers who share not only the physical hardship but also the emotional trauma of war (Elder & Clipp, 1989; Whitehouse, 2012; Whitehouse et al., 2017). Following social rejection, specifically, individuals are thought to experience a heightened desire for social connection that motivates them to use affiliative strategies to connect with others they perceive

as likely to offer acceptance and support (Smart Richman & Leary, 2009). Experimental research shows that individuals who are ostracized feel greater group-based identification (Schmitt & Branscombe, 2002), conform more to others' opinions (Williams et al., 2002), cooperate more with others (Ouwerkerk et al., 2005), work harder in group settings (Williams & Sommer, 1997), and allocate higher cash rewards to others (Maner et al., 2007). Similar effects have been reported when social rejection is both experienced vicariously and virtually mediated. Individuals who observe others being ostracized report increased negative affect, pain, need threat, and rejection likelihood, regardless of whether they themselves are the target of ostracism (Giesen & Echterhoff, 2018; Nuñez et al., 2020; Poon et al., 2020; Wesselmann et al., 2009). Further, research shows that after attending to videos depicting others being ostracized, children express a threatened need to belong by mimicking others (Over & Carpenter, 2009), drawing themselves as more physically proximate to friends (R. Song et al., 2015), and selecting seating with higher physical proximity to others (Marinović et al., 2017). On this basis, individuals who collectively attend to others' social pain could be expected to be more motivated to use affiliative strategies to connect with one another than individuals who collectively attend to similar non-painful experiences, even when shared experiences are virtually mediated.

## 1.2 | Explanatory accounts

There are various mechanisms through which the experience of pain is known to motivate individuals to affiliate at individual and group levels (Bastian, Jetten, Hornsey & Leknes, 2014). Using explanations described in anthropological and social psychological literature, we derive three causal hypotheses to specifically explain why collectively attending to others' physical and social pain should be expected to promote affiliation among those with whom it is attended online. Where empirical evidence for these explanations centers on first-hand experiences of shared physical pain in ritualized contexts, we extend reasoning to instances in which physical and social pain attract others' collective attention online.

### 1.2.1 | Imagistic rituals

One explanation originating from anthropological literature centers on the concept of imagistic rituals, which are classified as infrequent but highly arousing. According to Whitehouse (2004, 2005, 2012); Whitehouse et al. (2017); Whitehouse and Lanman (2014), imagistic rituals prompt extensive personal reflection and evoke strong emotions to be stored in episodic memory. Memories are thought to involve who was present during the experience and generate a sense of personal meaning, which establish a basis for shared identity between attendees when combined. These cognitive processes occur in performers of imagistic rituals, but a similar process may apply to individuals who merely attend to such rituals (Xygalatas, 2008) due to their emotional investment and preexisting social ties (Kapitány et al., 2020; Konvalinka et al., 2011).

In support of this imagistic ritual bonding, experimental studies have shown that performers of religious collective rituals who experience strong dysphoric arousal exhibit greater and deeper reflection on their ritual experiences as compared to performers who experience little emotional arousal (Konvalinka et al., 2013; Richert et al., 2005; Russell et al., 2016). More recently, research has extended to nonreligious ritual contexts, including team sports defeat (Whitehouse et al., 2017), political conflict (Muzzulini et al., 2021), and terror attacks (Jong et al., 2015), all of which have been found to result in identity fusion following extensive personal reflection. For example, Northern Irish Republicans and Unionists who endured greater physical and emotional suffering as a member of their group (e.g., bodily assault, verbal attacks, public humiliation) have been reported to reflect more about their experiences and, in turn, feel more fused with their group (Jong et al., 2015). The mediating role of personal reflection has also been reported in online contexts following public outrage, where attendees who experienced identity fusion were dispersed globally and the emotionally dysphoric event had no measurable material impact on their lives (i.e., the death of a lion; Buhrmester et al., 2018). There is, therefore, considerable evidence to suggest that greater cognitive processing of dysphorically arousing experiences in the form of self-reflection may lead those who collectively attend to others' physical and social pain to feel affiliated with one another online.

### 1.2.2 | Perceived emotional synchrony

Alternately, eminent sociologist Durkheim (1915) theorized that collective rituals lead to a shared emotional state of *collective effervescence* in which emotions resonate without interference in attendees' consciousness, minimizing individual distinctions, and creating a sense of unity. Building upon this concept, a growing body of evidence from the field of social psychology has subsequently shown that individuals perceive emotional synchrony among those with whom they attend to common stimuli. Perceived emotional synchrony is identified by a collective state of high emotional arousal related to the intensification of emotional responses (Hopkins et al., 2016, 2019; Wlodarczyk et al., 2020) and has been said to occur under conditions of collective gathering, shared focused attention, and interpersonal synchrony (Collins, 2014; Rennung & Göritz, 2016; Wlodarczyk et al., 2020). Many forms of synchrony have been shown to reinforce social cohesion (for reviews see Pizarro et al., 2022; Rennung & Göritz, 2016), with perceived emotional synchrony specifically linked to in-group identification, identity fusion, openness to experience, positive affect, and adhesion to shared values (Bouchat, Rimé et al., 2020; Páez et al., 2015).

Studies from the field of anthropology support the presence of synchronous empathic arousal, in particular, among attendees of painful collective rituals. Data from collective fire-walking rituals suggests that ritual attendees experience increased fatigue (Fischer,

Xygalatas, Mitkidis et al., 2014) and fine-grained commonalities in heart-rate dynamics with related performers (Konvalinka et al., 2011; Xygalatas et al., 2011), indicating an associated empathic response that operates irrespectively of personal activity. Further, attendance at non-ritualized collective events arising from social distress, like sociopolitical protests and antiracism campaigns, has increasingly been found to promote collective identity, identity fusion, and social integration via the perception of emotional synchrony (Páez et al., 2007, 2015). Perceived emotional synchrony has also been found to link positive affect to positive perceptions of socioemotional climate, including positive perceptions of solidarity and mutual helping, during collective gatherings associated with terrorist attacks (Pelletier, 2018). Further, perceived emotional synchrony has been found to link feeling threatened in the context of pandemic to adherence to shared beliefs (Bouchat, Metzler et al., 2020).

In terms of virtually mediated collective attention, even when emotional experiences are not made explicit or observed, individuals routinely and spontaneously simulate others' anticipated, expected, or probable emotions (E. R. Smith & Mackie, 2016). Indeed, there is plentiful evidence that individuals socially project by assuming others share their beliefs, attitudes, and behaviors (Coleman, 2018; Robbins & Krueger, 2005; Ross et al., 1977). Some conceptualizations of perceived emotional synchrony require the physical copresence of attendees. However, literature increasingly supports the contagious nature of emotions online (Goldenberg & Gross, 2020), with evidence to suggest that perceived emotional synchrony can occur among individuals who are physically isolated as they watch online events (Drewery, 2022). Considered together, such findings suggest that perceived emotional synchrony has the potential to lead those who collectively attend to others' physical and social pain to feel connected online.

#### 1.2.3 | Moral cleansing

In a less commonly cited account also found in social psychological literature, attending to others' pain is thought to serve as a moral reminder. More specifically, according to the concept of moral cleansing, attending to others' pain serves as a moral reminder that makes moral concepts more salient (Bastian et al., 2011; Shariff & Norenzayan, 2007; Shu et al., 2012). By extension, the activation of moral concepts is argued to prompt attendees to act prosocially to achieve moral purification (van Bunderen & Bastian, 2014; Hwang, 2015; Shariff & Norenzayan, 2007).

Anthropological field studies report that attendees but not performers of painful collective rituals act more honestly after ritual attendance, leading Mitkidis et al. (2017) to conclude that the specific act of attending to others' pain in ritual contexts works as a moral reminder that motivates individuals to cleanse themselves by acting morally. In support of this reasoning, numerous links have been made between the experience of pain, particularly physical pain, and the perception of morality (Bastian et al., 2011; Inbar et al., 2013; Nelissen, 2011; Nelissen & Zeelenberg, 2009; Rothschild et al., 2015). For example, watching videos of others experiencing physical pain has been shown to reduce feelings of personal guilt (Bocian & Baryla, 2020). In addition, moral reminders have been reported as an effective means of reducing unethical behavior, including within online contexts (Hwang, 2015). However, although the embodiment of morality has attracted considerable empirical attention (Brandt & Reyna, 2011; Liljenquist et al., 2010; Schnall et al., 2008; Zhong & Liljenquist, 2006), the mediating role of moral cleansing is less well established. Still, moral cleansing offers a theoretically plausible explanation for why affiliative responses should be expected among those who collectively attend to others' physical pain, and perhaps also social pain, online.

Therefore, several accounts offer promising explanations for why merely collectively attending to others' pain should be expected to promote affiliation among those with whom it is attended online, including those extending from theories of imagistic rituals, perceived emotional synchrony, and moral cleansing. We suggest that these accounts are not necessarily mutually exclusive and that it is unlikely any single mechanism accounts for affiliation among those who collectively attend to others' physical or social pain. Yet, to our knowledge, few efforts have been made to directly compare mechanisms through which second-hand experiences of pain motivate co-attendees to affiliate.

### 1.3 | The current studies

Our current work had the aims of exploring the extent to which attending to others' pain promotes affiliation among those with whom it is attended online and identifying the mechanisms that account for these effects. Extending existing literature, we hypothesized that the experience of attending to others' physical (hypothesis 1) and social (hypothesis 2) pain online would promote affiliation among co-attendees to a greater extent than shared non-painful online experiences. We further hypothesized that greater cognitive processing of co-attended experiences (hypothesis 3), perceived emotional synchrony among co-attendees (hypothesis 4), and moral salience (hypothesis 5) would account for greater affiliation among co-attendees of painful as opposed to non-painful content in online contexts. We first set out to establish the phenomenon of collectively attended pain online (Study 1) and then to subsequently test our hypotheses (Study 2). Study protocols were approved by the Griffith University Human Ethics Committee (Reference Number: 2017/187) in accordance with the National Statement of Ethical Conduct in Human Research. Informed consent was obtained from all participants at the beginning of each study. As a condition of ethical approval, those who did not wish to watch videos depicting pain were advised not to participate in studies.

## 2 | STUDY 1

Engagement with online video continues to grow across demographic groups, outpacing the adoption rate of many other online activities (Madden, 2009; A. Smith & Anderson, 2018). However, there are still

few existing empirical accounts of collective attention in online contexts. Therefore, in Study 1, we sought to explore the phenomenon of pain collectively attended to online before testing our stated hypotheses in Study 2. Due to the nature of our research aims (i.e., collective attention to painful vs. non-painful content online), we did not make any specific hypotheses about the nature of attention (i.e., singular vs. collective attention or attention in-person vs. online). Instead, we sought to identify usual engagement frequency with online videos depicting pain, usual awareness of and interactions with co-attendees when watching videos online, and self-reported perceptions of collective attention when watching painful online content.

## 2.1 | Method

### 2.1.1 | Participants

Seventy-four undergraduate students (66.22% female; $M_{age}$ = 25.31 years, $SD_{age}$ = 6.81 years) were recruited from Griffith University and remunerated with course credit.

### 2.1.2 | Procedure

All materials were presented to participants in an online questionnaire upon recruitment. Initially, participants were asked about the frequency and nature of their own experiences watching videos online. Participants were subsequently randomly assigned to one of three pain conditions in which they were presented with a video depicting either a physically painful ($n$ = 25), socially painful ($n$ = 22), or non-painful ($n$ = 27) experience. To emulate real-world contexts where multiple people watch online content, often simultaneously, it was emphasized that other students were also watching videos as part of the study. Participants were instructed to add a comment beneath videos, which was collected for use in Study 2. Videos were followed by a measure of perceived collective attention.

## 2.2 | Materials and measures

### 2.2.1 | Engagement frequency and nature

Participants rated their usual engagement with online videos generally as well as videos involving physical pain and social pain in single-item measures (0 = *never*, 1 = *very rarely*, 5 = *very frequently*). For a collective attention state to occur, an individual must first be aware that others are co-attending to the same content (Shteynberg, 2015). On this basis, participants rated how often they would usually engage in seven behaviors designed to explore their usual awareness of co-attendees (e.g., "take note of how many views the video has," "take note of other peoples' reactions to the video," "read comments made by other people on the video"; 0 = *never*, 1 = *very rarely*, 5 = *very frequently*; $\alpha$ = .83). Previous research has identified social motives for engaging with online video (Haridakis & Hanson, 2009). On this basis, participants also rated how often they would usually engage in five behaviors designed to explore their interactions with co-attendees when watching videos online (e.g., "react to the video," "think about other people who you might share the video with," "share the video with people you know"; 0 = *never*, 1 = *very rarely*, 5 = *very frequently*; $\alpha$ = .79).

### 2.2.2 | Video stimulus

Videos depicting real-world experiences were sourced from the video-sharing website YouTube to address the threat to external validity posed by depicting artificially constructed experiences (see also Ashton-James et al., 2014; Rae Westbury & Neumann, 2008). Videos depicted either a physically painful (i.e., facial impalement), socially painful (i.e., loss of child), or non-painful (i.e., fishing) experience involving a Caucasian male. All videos were equal in length (1:13 min) and were matched on pilot pain intensity ratings (four-items rated on a scale from 0 = *not at all* to 10 = *extremely*; $\alpha$ = .96; adapted from Bastian, Jetten & Ferris, 2014; Bayet et al., 2014; Price et al., 1983) and state personal distress ratings (six-items rated on a scale from 1 = *not at all* to 7 = *extremely*; $\alpha$ = .97; Batson et al., 1987, 1997; Batson & Shaw, 1991).

### 2.2.3 | Collective attention

The collective attention state is the perception of in-the-moment attention to stimuli from a first-person-plural perspective (Shteynberg, 2015). In line with this definition, participants rated the degree to which they agreed with the statement "we are attending to the video" in a single-item measure (1 = *strongly disagree*, 7 = *strongly agree*; for similar single-item measures see Drewery, 2022; Wlodarczyk et al., 2020).

## 2.3 | Results

### 2.3.1 | Engagement frequency and nature

In terms of usual engagement, all participants reported engaging with videos online and, on average, reported doing so relatively frequently (100.00%, $M$ = 4.04, $SD$ = 1.09). The majority of participants also reported having engaged with online videos involving physical and social pain, though on average, reported engaging with them relatively infrequently (72.97%, $M$ = 1.62, $SD$ = 1.50% and 72.97%, $M$ = 1.69, $SD$ = 1.44, respectively). Almost all participants reported that they had been aware of co-attendees and had interacted with them in some way when watching videos online. However, they reported infrequently engaging in both sets of behaviors (98.65%, $M$ = 1.60, $SD$ = 0.87, and 97.30%, $M$ = 1.61, $SD$ = 0.97, respectively).

### 2.3.2 | Collective attention

Using one-way ANOVA we found a significant difference in perceived collective attention between pain conditions, $F(2, 71) = 4.42$, $MSE = 2.01$, $p = .016$, $\eta^2 = 0.11$. Simple contrasts showed that perceived collective attention ratings were significantly higher in both the physical pain ($M = 4.48$, $SD = 1.42$) and social pain ($M = 4.77$, $SD = 1.41$) conditions than in the no-pain condition ($M = 3.63$, $SD = 1.42$), $p = .034$, 95% confidence intervals (CI): [0.07−1.63] and $p = .006$, 95% CI: [0.33−1.95], respectively. Perceived collective attention ratings were not significantly different between the physical pain and social pain conditions, $p = .482$, 95% CI: [−1.12 to 0.53].

## 2.4 | Discussion

We found engagement with online content depicting pain to be a relatively common experience. Over 70% of participants reported engaging with online videos depicting physical and social pain. In support of social motives for engaging with online video (Haridakis & Hanson, 2009), over 90% of participants reported being aware of and interacting with co-attendees when watching videos online. Moreover, while online videos elicited a general feeling of *we are attending*, videos depicting pain elicited significantly stronger perceived collective attention ratings than non-painful content. Collective attention online has been evidenced through peaks in the popularity of hashtags (Lehmann et al., 2012), burst-like increases in Tweets (Sasahara et al., 2013), growth cycles in the popularity of news articles (Wu & Huberman, 2007), and self-reported shared attention (Drewery, 2022). Yet, the amplification of shared experiences has been shown to be minimized by spatial and also psychological distance between co-attendees (Boothby et al., 2016). Based on our experimental design, which included the instruction that similar others' were also watching the same online content as part of the study, information about potential co-attendees may be seen to elicit the perception of shared attention in the absence of physical proximity (Boothby et al., 2016; Shteynberg et al., 2016). Shteynberg (2015) has further postulated that virtually-mediated collective attention between strangers may be possible because individuals know that co-attendees chose to attend to the same content as them, creating psychological proximity based on similarity of online viewing preferences (Pinel et al., 2006).

Notably, collective attention ratings in this study appear to suggest that pain manifested online elicits stronger perceptions of in-the-moment attention from a first-person-plural perspective than non-painful online content. From an evolutionary perspective, behavioral manifestations of pain alert nearby others to potential proximal threats to physical safety (Craig, 2009; Craig et al., 2010; Eccleston & Crombez, 1999; Hadjistavropoulos et al., 2011; Yamada & Decety, 2009) and social connection (Eisenberger, 2012; MacDonald & Leary, 2005). As a result, pain interrupts the collective attention of other social agents (Crombez et al., 1997; Eccleston & Crombez, 1999), and consistent with our finding, commands collective attention to a greater extent than non-painful stimuli. On this basis, the experience of collectively attending to others' physical and social pain online may be seen to increase collective orientation to a greater extent than the experience of collectively attending to non-painful stimuli online, priming individuals for social connection, as hypothesized.

# 3 | STUDY 2

In Study 2, we subsequently sought to test the prediction that collectively attending to others' physical and social pain leads to greater affiliation among co-attendees than collectively attending to non-painful content in online contexts (hypotheses 1 and 2). Further, we sought to test the predictions that cognitive resource allocation (hypothesis 3), perceived emotional synchrony (hypothesis 4), and moral salience (hypothesis 5) act in parallel to promote affiliation among those who collectively attend to others' physical and social pain online. Previous research has found shared pain to influence a wide range of positive psychosocial outcomes (for a review see Bastian, Jetten, Hornsey & Leknes, 2014). To attempt to replicate group-level findings in online contexts and consistent with other research, we operationalized affiliative attitudes as self-reported cohesion (e.g., Bastian, Jetten & Ferris, 2014; Leach et al., 2007; Páez et al., 2007, 2015; Wlodarczyk et al., 2020), interpersonal closeness (e.g., Reddish et al., 2013, 2016; Swann et al., 2009; Vezzali et al., 2016), and desire to affiliate (e.g., Lakin & Chartrand, 2003). Additionally, we operationalized affiliative behavior as low-cost generosity. A low-cost generosity game was chosen over more common public goods games, as in standard public goods games decisions to benefit others are at considerable cost to self-interest. However, in real-world contexts, as in generosity games, decisions to benefit others are often at minimal cost to self-interest (e.g., posthumous organ donation; Zhao et al., 2016). Notably, the interpersonal effects of shared dysphoric experiences have been shown to extend from 1 week for common collective events (Páez et al., 2015; Rimé, 2007) to between 3 weeks (Páez et al., 2007) and several months (D. Garcia & Rime, 2019) for more intense collective events. To assess the longevity of predicted affiliative outcomes, data were collected immediately after participants attended to online content (Time 1) and at 1-week follow-up (Time 2). A shorter rather than longer follow-up period was utilized as the study's video stimulus was considered to represent a relatively brief and commonplace, though purposely intense, collective experience.

## 3.1 | Method

### 3.1.1 | Participants

Participants recruited from Griffith University were remunerated with course credit for completing two online questionnaires. We

collected 211 complete responses to the first questionnaire administered after recruitment at Time 1. Using participant identification numbers and demographic information, we identified 26 repeat responses from participants to the first questionnaire. Therefore, data from 185 participants were screened for inclusion in Time 1 analyses (75.14% female; $M_{age}$ = 22.62 years, $SD_{age}$ = 7.44 years). We then collected 169 complete responses to the second questionnaire, administered approximately 1 week after completion of the first questionnaire at Time 2. Using participant identification numbers, we matched data from 93 participants across the first and second questionnaires. Loss of data was due to repeat responses to the second questionnaire (Time 2 repeat responses with valid identification numbers, $n$ = 3), participant use of invalid participant identification numbers in the second questionnaire, and loss at follow-up (Time 1 responses not matched, $n$ = 92; Time 2 responses with a nonnumerical identification entry, $n$ = 52; Time 2 responses with an identification number not matched, $n$ = 21). Due to delayed response times to the second questionnaire (>14 days), data from a further two participants were dropped. Consequently, data from 91 participants were screened for inclusion in Time 2 analyses (72.53% female; $M_{age}$ = 23.32 years, $SD_{age}$ = 8.19 years).

### 3.1.2 | Procedure

A link to the first online questionnaire was provided to participants upon recruitment (Time 1). At the beginning of the questionnaire, participants were randomly assigned to one of three pain conditions in which they were presented with a video depicting either a physically painful (i.e., facial impalement), socially painful (i.e., loss of a child), or non-painful (i.e., fishing) experience (Time 1 analyses $n$ = 63, 62, and 60 respectively; Time 2 analyses $n$ = 31, 28, and 32, respectively). Videos were identical to those used in Study 1, except for the non-painful video, which was edited to exclude the catching of fish based on collected comments. Videos were presented to participants in a mock online video format to emulate real-world contexts. Videos were accompanied by a set of comments constructed from deidentified responses in Study 1 (e.g., "pretty cool man, do you find fishing therapeutic," no-pain), and participants were able to add their own comments to videos. It was emphasized that the video had also been watched by other students who had made the accompanying comments. Videos were followed by measures of cognitive resource allocation, perceived emotional synchrony, moral salience, cohesion, interpersonal closeness, desire to affiliative, and low-cost generosity. Approximately 1 week after completing the first questionnaire, participants were emailed a link to the second online questionnaire ($M_{completion}$ = 8.23 days, $range_{completion}$ = 5–12 days; Time 2). At the beginning of the questionnaire, participants were reminded that they had previously been presented with a video that other students had also watched and commented on. Participants were then presented with further measures of cognitive resource allocation and repeat measures of cohesion, interpersonal closeness, and desire to affiliate.

## 3.2 | Measures

### 3.2.1 | Cognitive resource allocation

We operationalized cognitive resource allocation as self-reported consumption, reflection, and memory ratings. At Time 1, we used a single-item measure of self-reported consumption (e.g., to what extent were you "consumed by the experience"; 1 = *not at all*, 7 = *completely*). At Time 2, we measured cognitive resource allocation by asking participants to rate how often they reflected on the video over the last week (1 = *I have not thought about it at all*, 7 = *I have thought about it very frequently*; for similar measures of reflection frequency see Jong et al., 2015) and how well they remembered both "the video and the experience depicted in it" and "students and their comments on the video" ($\alpha$ = .75; 1 = *I don't remember at all*, 7 = *I remember very well*; for similar measures of depth of reflection see Buhrmester et al., 2018).

### 3.2.2 | Perceived emotional synchrony

We then measured perceived emotional synchrony using a six-item scale adapted from Páez et al. (2015) Perceived Emotional Synchrony Scale. Items administered at Times 1 and 2 included "we felt more intense emotions because we all observed the same experience," "we felt a strong emotional bond between us," "we felt a strong rapport between us," "we all shared the same strong feelings," "we felt more sensitive to our emotions because we were surrounded by people who felt the same," and "we shared a moment of unity" (1 = *not at all*, 7 = *very much*; $\alpha$ = .95). Items was chosen to reduce participant burden associated with longer-item scales (e.g., 18-item scales; Páez et al., 2015) and because some alternate shorter-item scales allude to synchronized action not relevant to the online nature of this study (e.g., "we performed as one, like a single person"; Wlodarczyk et al., 2020).

### 3.2.3 | Moral salience

Participants completed a single-item measure of how "moral" they felt while watching each video (1 = *not at all*, 5 = *extremely*) at Times 1 and 2.

### 3.2.4 | Cohesion

We used an 11-item self-report measure of cohesion adapted from previous research (Bastian, Jetten & Ferris, 2014; Leach et al., 2007) at Times 1 and 2. Items included "I feel a sense of solidarity with the students in this group," "I feel connected to the students in this group," "I feel part of this group of students," "I feel a sense of loyalty to the students in this group," "I feel I can trust the students in this group," "I feel that the students in this group have a lot in common," "I

feel like there is unity between the students in this group," "I see myself as a member of this group," "I am glad to be categorized as a member of this group," "I identify with the students in this group," and "I feel strong ties to the students in this group" (1 = *strongly disagree*, 7 = *strongly agree*; $\alpha = .96$).

### 3.2.5 | Interpersonal closeness

Participants completed a single-item pictorial measure of interpersonal closeness adapted from Schubert and Otten's (2002) Self-Group Overlap scale at Times 1 and 2. The scale comprised seven pairs of circles representing the self and a given in-group that varied in their degree of overlap (1 = *no overlap*, 7 = *high degree of overlap*). Participants were instructed to select the pair of circles that best represented how close they felt to the group of students who also watched the video.

### 3.2.6 | Desire to affiliate

We also asked participants whether they "would like to spend more time with the students who also watched the video outside of this study" as a single-item measure of desire to affiliate at Times 1 and 2 (1 = *not at all*, 7 = *very much*; for similar measures of desire to affiliate see Lakin & Chartrand, 2003).

### 3.2.7 | Generosity

We measured low-cost generosity in a hypothetical game, played only at Time 1 to reduce participant burden (Güth, 2010; Güth et al., 2012). Following Zhao et al. (2016), participants were presented with 11 different payoff combinations described in terms of hypothetical points. Participants' own payoff was fixed at 5 points, while payoffs for other students who watched the video varied in 1-point increments between zero and 10 points (e.g., "You receive 5 points. Each of the other students receives 0 points"). Accordingly, the most generous choice was that with the highest payoff (0 = *ungenerous*, 10 = *generous*). This particular generosity game was suited to the experimental design of the study as it is easily adapted to non-specifiable group sizes.

## 3.3 | Results

### 3.3.1 | Data screening

Data were visually inspected to identify influential univariate outliers at all levels of the grouped data (Tabachnick & Fidell, 2013). One participant in the no-pain condition was associated with influential data and excluded from all analyses (Time 1 and 2). Means and standard deviations for all antecedent and consequent variables are shown in Table 1, while inter-correlations between antecedent and consequent variables are shown in Table 2 (Time 1 analyses) and Table 3 (Time 2 analyses).

### 3.3.2 | ANOVA

To test hypotheses 1 and 2, we investigated the effect of collectively attended physical and social pain on affiliation using one-way ANOVA, followed by simple contrasts with Bonferroni corrections. At Time 1, there were significant differences between pain conditions in cohesion, $F(2, 181) = 8.90$, $MSE = 2.04$, $p < .001$, $\eta^2 = 0.09$, interpersonal closeness, $F(2, 181) = 6.27$, $MSE = 2.27$, $p = .002$, $\eta^2 = 0.06$, and desire to affiliate, $F(2, 181) = 3.23$, $MSE = 2.30$, $p = .042$, $\eta^2 = 0.03$. Participants in the social pain condition reported significantly greater cohesion, $p < .001$, 95% CI: [0.47–1.72], interpersonal closeness, $p = .002$, 95% CI: [0.28–1.61], and desire to affiliate, $p = .036$, 95% CI: [0.03–1.37], than those in the no-pain condition. Participants in the physical pain condition also reported higher interpersonal closeness than those in the no-pain condition, $p = .047$, 95% CI:

**TABLE 1** Means (and standard deviations) of antecedent and consequent variables included in Time 1 and Time 2 analyses across pain conditions

| Variable | Pain condition | | |
|---|---|---|---|
| | Physical pain | Social pain | No-pain |
| Time 1 analyses | | | |
| Consumption | 5.14 (1.31) | 4.92 (1.47) | 3.64 (1.53) |
| Perceived emotional synchrony | 3.74 (1.35) | 4.12 (1.76) | 2.20 (1.10) |
| Morality | 2.32 (1.23) | 2.69 (1.33) | 1.63 (0.89) |
| Cohesion | 3.18 (1.37) | 3.76 (1.60) | 2.67 (1.29) |
| Interpersonal closeness | 3.44 (1.45) | 3.73 (1.59) | 2.78 (1.47) |
| Desire to affiliate | 3.17 (1.65) | 3.53 (1.51) | 2.83 (1.37) |
| Generosity | 5.94 (2.26) | 6.19 (2.19) | 5.63 (2.11) |
| Time 2 analyses | | | |
| Consumption | 5.16 (1.32) | 4.71 (1.72) | 3.90 (1.60) |
| Reflection | 1.77 (1.18) | 1.36 (0.73) | 1.52 (0.63) |
| Memory | 3.73 (1.53) | 2.95 (1.08) | 3.18 (1.23) |
| Perceived emotional synchrony | 3.76 (1.33) | 3.45 (1.77) | 2.10 (1.02) |
| Morality | 2.39 (1.28) | 2.50 (1.40) | 1.65 (0.84) |
| Cohesion | 2.48 (1.20) | 2.99 (1.26) | 2.88 (1.30) |
| Interpersonal closeness | 2.52 (1.26) | 3.11 (1.23) | 2.26 (1.44) |
| Desire to affiliate | 2.68 (1.45) | 3.21 (1.32) | 3.03 (1.56) |

*Note*: Time 1 analyses, $N = 184$; Time 2 analyses, $N = 90$.

**TABLE 2** Intercorrelations between antecedent and consequent variables included in Time 1 analyses

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Physical pain | - | | | | | | | | |
| 2. Social pain | −.51*** | - | | | | | | | |
| 3. Consumption | .26*** | .15* | - | | | | | | |
| 4. Perceived emotional synchrony | .16* | .32*** | .56*** | - | | | | | |
| 5. Morality | .06 | .27*** | .31*** | .55*** | - | | | | |
| 6. Cohesion | −.01 | .26*** | .45*** | .73*** | .43*** | - | | | |
| 7. Interpersonal closeness | .06 | .18** | .29*** | .49*** | .32*** | .63*** | - | | |
| 8. Desire to affiliate | −.01 | .16* | .31*** | .49*** | .34*** | .61*** | .59*** | - | |
| 9. Generosity | .004 | .09 | .11 | .01 | −.08 | .02 | .09 | .22** | - |

*Note*: $N = 184$.
*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

**TABLE 3** Intercorrelations between antecedent and consequent variables included in Time 2 analyses

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Physical pain | - | | | | | | | | | |
| 2. Social pain | −.49*** | - | | | | | | | | |
| 3. Consumption | .26** | .05 | - | | | | | | | |
| 4. Reflection | .18 | −.15 | .16 | - | | | | | | |
| 5. Memory | .24* | -.18 | .27** | .19 | - | | | | | |
| 6. Perceived emotional synchrony | .31** | .15 | .58*** | .26** | .03 | - | | | | |
| 7. Morality | .13 | .18 | .26** | .25* | .08 | .48*** | - | | | |
| 8. Cohesion | -.17 | .12 | .26** | .23* | .07 | .36*** | .25* | - | | |
| 9. Interpersonal closeness | -.05 | .25* | .30** | .32** | .08 | .42*** | .35*** | .64*** | - | |
| 10. Desire to affiliate | −.15 | .12 | .13 | .21* | −.03 | .26** | .15 | .67*** | .52*** | - |

*Note*: $N = 90$.
*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

[0.01−1.32]. There were no other differences in cohesion, interpersonal closeness, or desire to affiliate between pain conditions, $ps > .074$. There was no difference between pain conditions in generosity at Time 1, $F(2, 181) = 1.01$, $MSE = 4.79$, $p = .365$, $\eta^2 = 0.01$.

At Time 2, the only difference between pain conditions resulted from interpersonal closeness, $F(2, 87) = 3.19$, $MSE = 1.73$, $p = .046$, $\eta^2 = 0.07$. Participants in the social pain condition reported higher interpersonal closeness than those in the no-pain condition, $p = .046$, 95% CI: [0.01−1.69]. There were no other differences in interpersonal closeness between pain conditions, $ps > .265$. No difference was found between pain conditions in cohesion, $F(2, 87) = 1.42$, $MSE = 1.57$, $p = .248$, $\eta^2 = 0.03$, or desire to affiliate, $F(2, 87) = 1.06$, $MSE = 2.10$, $p = .351$, $\eta^2 = 0.02$, at Time 2.

### 3.3.3 | Mediation analyses

Methodological studies using empirical simulation have shown that mediated effects may be statistically significant even when the total effect is not (for a review see O'Rourke & MacKinnon, 2018). Consequently, we tested mediated pathways between collectively attended pain and affiliation from hypotheses 3, 4, and 5 for Time 1 and 2 measures as planned, resulting in seven separate mediation models. Graphical summaries of mediation models are shown in Figures 1 and 2, while observed mediation models are depicted in Supporting Information: Figures S1 through S7. Consistent with contemporary approaches, mediation models were tested using ordinary least squares path analyses in the PROCESS macro (Version 3.4; Hayes, 2017) for the statistical software package SPSS (Version 25). Mediation models were conducted with pain condition as a multicategorical antecedent to examine the

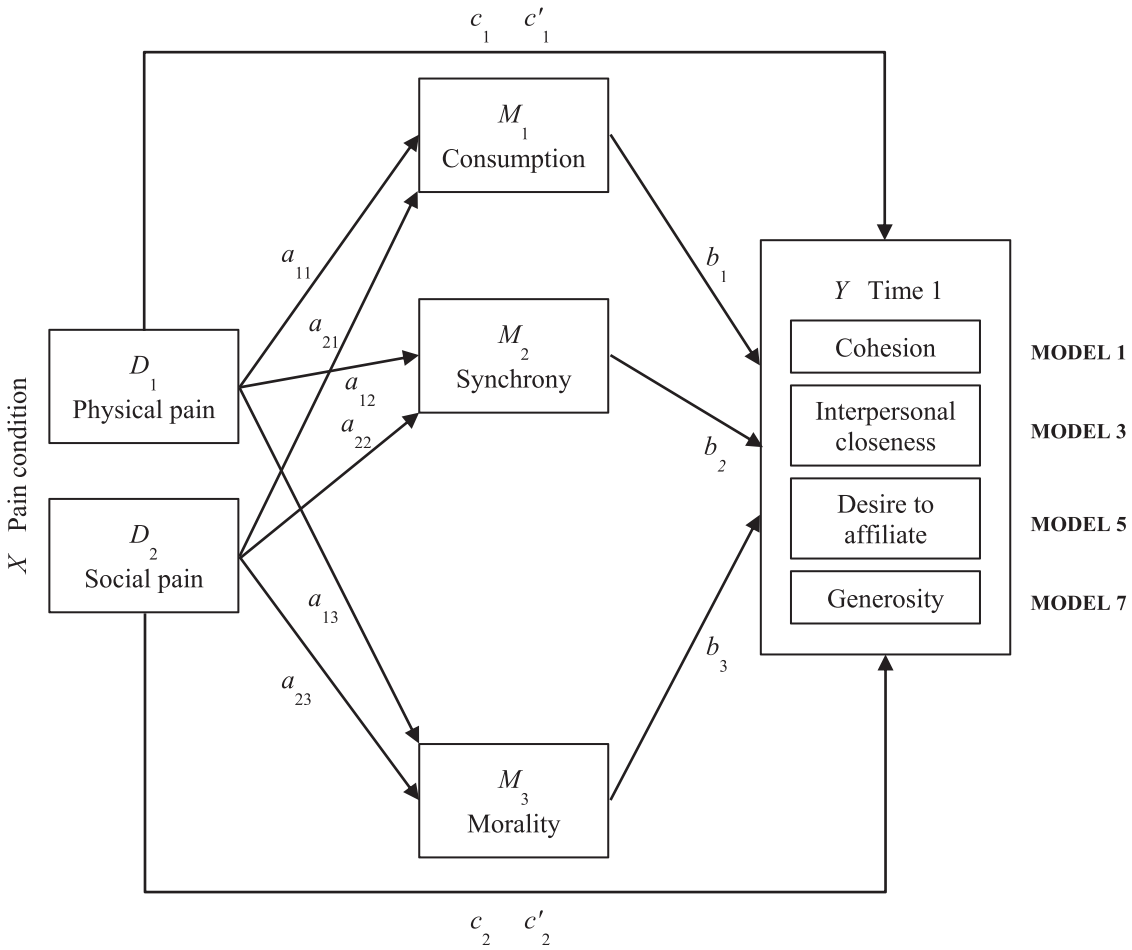


**FIGURE 1** Mediation models tested in Time 1 analyses. Graphical summary of models depicting the predicted relative effects of collectively attending to others' physical and social pain on affiliation measured at Time 1 as mediated by consumption, perceived emotional synchrony, and morality.

effect of attending to physical or social pain relative to non-painful content online. As such, pain condition was treated using indicator coding with no-pain specified as the reference group (Hayes & Preacher, 2013). Mediation models were also conducted with multiple parallel mediators to allow for formal comparison of mechanisms that might account for the predicted affiliative effects of collectively attending to others' pain online. Indirect effects were bootstrapped with 10,000 replications. Using this approach, bootstrapped 95% CIs for indirect effects that do not contain zero are considered significant. When used to test hypotheses, bootstrap CIs offer higher power than the normal theory approach (Hayes, 2017).

### 3.3.4 | Cohesion at Time 1 and Time 2

In separate models, we tested the relative effect of collectively attending to others' pain on cohesion measured at Time 1 (model 1) and Time 2 (model 2) as mediated by cognitive resource allocation, perceived emotional synchrony, and moral salience. Physical and social pain indirectly influenced cohesion measured at Time 1 through perceived emotional synchrony, $a_{12}b_{2\text{physical pain}} = 1.00$, bootstrap *SE* = 0.18, bootstrap 95% CI: [0.67−1.37] and $a_{22}b_{2\text{social pain}} = 1.25$, bootstrap *SE* = 0.22, bootstrap 95% CI: [0.85−1.71], respectively. Physical and social pain also indirectly influenced cohesion measured at Time 2 through perceived emotional synchrony, $a_{14}b_{4\text{physical pain}} = 0.54$, bootstrap *SE* = 0.22, bootstrap 95% CI: [0.16−1.05] and $a_{24}b_{4\text{social pain}} = 0.43$, bootstrap *SE* = 0.20, bootstrap 95% CI: [0.11−0.91], respectively. Consistent with hypothesis 4, participants who collectively attended to others' pain compared to non-painful content reported greater perceived emotional synchrony, and participants who reported greater perceived emotional synchrony reported greater cohesion with co-attendees. There was no evidence that physical or social pain indirectly influenced cohesion through cognitive resource allocation (hypothesis 3) or moral salience (hypothesis 5).

### 3.3.5 | Interpersonal closeness at Time 1 and Time 2

In separate models, we tested the relative effect of collectively attending to others' pain on interpersonal closeness measured at

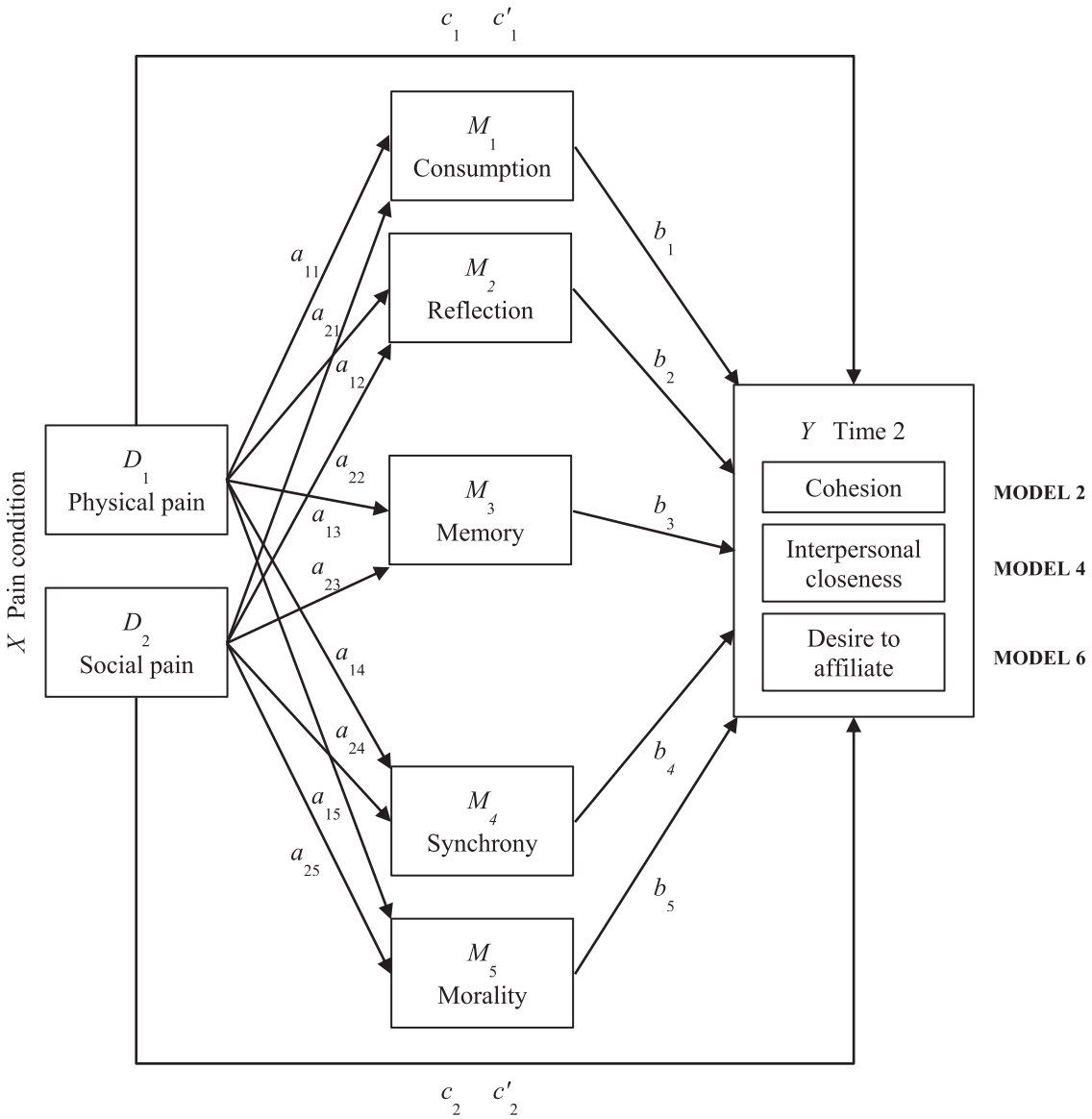


**FIGURE 2** Mediation models tested in Time 2 Analyses. Graphical summary of models depicting the predicted relative effects of collectively attending to others' physical and social pain on affiliation measured at Time 2 as mediated by consumption, reflection, memory, perceived emotional synchrony, and morality.

Time 1 (model 3) and Time 2 (model 4) as mediated by cognitive resource allocation, perceived emotional synchrony, and moral salience. Physical and social pain indirectly influenced interpersonal closeness measured at Time 1 through perceived emotional synchrony, $a_{12}b_{2\text{physical pain}} = 0.64$, bootstrap SE = 0.16, bootstrap 95% CI: [0.36–0.97] and $a_{22}b_{2\text{social pain}} = 0.80$, bootstrap SE = 0.18, bootstrap 95% CI: [0.47–1.18], respectively. Physical and social pain also indirectly influenced interpersonal closeness measured at Time 2 through perceived emotional synchrony, $a_{14}b_{4\text{physical pain}} = 0.39$, bootstrap SE = 0.20, bootstrap 95% CI: [0.04–0.84] and $a_{24}b_{4\text{social pain}} = 0.31$, bootstrap SE = 0.17, bootstrap 95% CI: [0.03–0.69], respectively. Consistent with hypothesis 4, participants who collectively attended to others' pain compared to non-painful content reported greater perceived emotional synchrony, and participants who reported greater perceived emotional synchrony reported greater interpersonal closeness with co-attendees. There was no evidence that physical or social pain indirectly influenced interpersonal closeness through cognitive resource allocation (hypothesis 3) or moral salience (hypothesis 5).

### 3.3.6 | Desire to affiliate at Time 1 and Time 2

In separate models, we tested the relative effect of collectively attending to others' pain on participants' desire to affiliate measured at Time 1 (model 5) and at Time 2 (model 6) as mediated by cognitive resource allocation, perceived emotional synchrony, and moral salience. Physical and social pain indirectly influenced desire to

affiliate measured at Time 1 through perceived emotional synchrony, $a_{12}b_{2physical\ pain} = 0.64$, bootstrap $SE = 0.15$, bootstrap 95% CI: [0.37−0.96] and $a_{22}b_{2social\ pain} = 0.80$, bootstrap $SE = 0.19$, bootstrap 95% CI: [0.45−1.20], respectively. Physical and social pain also indirectly influenced desire to affiliate measured at Time 2 through perceived emotional synchrony, $a_{14}b_{4physical\ pain} = 0.49$, bootstrap $SE = 0.26$, bootstrap 95% CI: [0.04−1.08] and $a_{24}b_{4social\ pain} = 0.40$, bootstrap $SE = 0.24$, bootstrap 95% CI: [0.03−0.97], respectively. Consistent with hypothesis 4, participants who collectively attended to others' pain compared to non-painful content reported greater perceived emotional synchrony, and participants who reported greater perceived emotional synchrony reported a greater desire to affiliate with co-attendees. There was no evidence that physical or social pain indirectly influenced participants' desire to affiliate through cognitive resource allocation (hypothesis 3) or moral salience (hypothesis 5).

#### 3.3.7 | Generosity at Time 1

We tested the relative effect of collectively attending to others' pain on generosity measured at Time 1 as mediated by consumption, perceived emotional synchrony, and morality (model 7). There was no evidence that physical or social pain indirectly influenced generosity through consumption (hypothesis 3), perceived emotional synchrony (hypothesis 4), or morality (hypothesis 5).

### 3.4 | Discussion

Building upon previous work, we expected collective attention to physical and social pain to promote cohesion, interpersonal closeness, desire to affiliate, and generosity among co-attendees to a greater extent than collective attention to non-painful content in online contexts (hypotheses 1 and 2). What we found was that collective attention to others' physical and social pain online consistently indirectly promoted affiliative attitudes among co-attendees but not affiliative behaviors. More specifically, we found perceived emotional synchrony to mediate the influence of collectively attending to others' pain on affiliative attitudes, but not affiliative behaviors, online (Hypothesis 4). We did not find any evidence to suggest that collectively attending to others' pain indirectly influences affiliation online through greater cognitive processing of co-attended experiences (hypothesis 3) or moral salience (hypothesis 5).

#### 3.4.1 | Perceived emotional synchrony

As hypothesized, collectively attending to others' physical and social pain indirectly promoted cohesion, interpersonal closeness, and desire to affiliate measured immediately after co-attention through to 1-week follow-up via its effect on perceived emotional synchrony (hypothesis 4). These findings suggest that affiliative attitudes, previously reported in response to physically painful collective rituals (Xygalatas et al., 2013) and dysphoric collective gatherings (Jong et al., 2015; Páez et al., 2007, 2015), are replicated to some extent among those who collectively attended non-ritualized physical and social pain online. Baranowski-Pinto et al. (2022) reported that bonding during collective events depends substantially on the interpersonal dynamics that occur among those who are physically copresent in large crowds. However, our findings suggest that perceived emotional synchrony has the potential to promote affiliative attitudes among physically dispersed co-attendees, independently of coordinated action (e.g., marching in step, dancing in rhythm), in-the-moment synchronous co-attention (e.g., attending at exactly the same time), and active emotional sharing (e.g., disclosing feelings to co-attendees; Rennung & Göritz, 2015). Work by Drewery (2022) suggests that in online contexts, self-reported shared attention is positively related to perceived emotional synchrony through mentalisation. Or, more specifically, that the perception of collective attention online encourages individuals to think more deeply about co-attendees' experiences, resulting in a greater sense that the experience is being shared. We therefore define perceived emotional synchrony as the perception of synchronous emotional experiences emerging from a collective attention state, occurring in the absence of mutual causal influence, and resulting in interpersonal bonding. We acknowledge that emotional synchrony arising from co-attendees who share physical space may be more personally meaningful and memorable (Baranowski-Pinto et al., 2022). However, virtually mediated experiences represent important opportunities for creating social connection and a sense of community (Han & Lee, 2014; Haridakis & Hanson, 2009; Khan et al., 2016; Sjöblom & Hamari, 2017), and virtually mediated emotional synchrony has the potential to bond together larger and more diverse social networks.

Notably, perceived emotional synchrony did not have a mediating effect on generosity, as we hypothesized (hypothesis 4). One possible explanation for this finding is our decision to operationalize affiliative behavior as low-cost generosity measured using a hypothetical game. Previous work has operationalized affiliative behavior as cooperation measured using economic games in which decisions to benefit one's partner are at a cost to self-interest and are incentivized (Bastian, Jetten, Hornsey & Leknes, 2014), both of which are known to influence decision-making (Zhao et al., 2016). Also of consideration is the social context in which collective attention occurred online. While collective attention in this study was a discrete event, communication between co-attendees following a collective attention state may augment affiliation (Buhrmester et al., 2018; Cui et al., 2016; D. Garcia & Rime, 2019; Lin et al., 2014; Lobato & Sainz, 2020). For example, an analysis of digital traces of 62,114 Twitter users after the 2015 Paris terrorist attacks found that long-term expressions of solidarity were related to the previous expression of collective emotions (D. Garcia & Rime, 2019). Other work has reported that perceived emotional synchrony is as much as 20% greater in online contexts where the opportunity to communicate with co-attendees is available as opposed to unavailable

(Drewery, 2022). As highlighted by Buhrmester et al. (2018), understanding the impact of continued communication and identifying the key components of affiliation that elicit communication after a precipitating collective attention state could help harness affiliative outcomes.

### 3.4.2 | Cognitive resource allocation

Although we found the act of collectively attending to others' physical and social pain to be significantly more consuming than collectively attending to non-painful content online, increased allocation of cognitive resources to co-attended pain did not result in significantly more reflection or significantly better memory at 1-week follow-up, nor did it influence affiliation among co-attendees (hypothesis 3). That we did not find evidence to support the mediating role of cognitive resource allocation is unexpected, given that reflection on collectively attended viral media content has been found to result in strong interpersonal bonding. However, in their study, Buhrmester et al. (2018) reported that cohesion among individuals increased most for those who continued to reflect deeply on the experience and felt the experience was central to their own lives even though it had no material impact. Co-attended videos in this study depicted real-world experiences and, according to pilot ratings, were perceived to be relatively intense in nature. Yet, the experience of attending to them was unlikely to be perceived as central to attendees' lives. Following this reasoning, our findings appear to reinforce that shared experiences must be emotionally intense as well as self-defining or life-altering for an increased allocation of cognitive resources to fuse co-attendees together. However, upon closer inspection of relevant literature, we note that several other studies have also failed to find hypothesized relationships between self-reflection on dysphorically arousing experiences and identity fusion or have found identity fusion to be most strongly associated with positive affect during collective events with the same relationship not observed for negative affect (Kapitány et al., 2020; Kavanagh et al., 2019; Pelletier, 2018; Vázquez et al., 2017). At present, the precise qualities of shared dysphoric experiences and the nature of personal reflection that links imagistic rituals to interpersonal bonding remain unclear, with more theoretically driven exploration needed.

### 3.4.3 | Moral cleansing

Although we found collectively attending to others' physical and social pain to elicit significantly higher feelings of morality than collectively attending to non-painful content online, there was no relationship between moral salience and any measure of affiliation (hypothesis 5). Some work has found evidence to support the role of moral cleansing effects among attendees of painful collective rituals (Mitkidis et al., 2017). However, several other published studies have failed to replicate general moral cleansing effects (Earp et al., 2014; Fayard et al., 2009; Rotella & Barclay, 2020), an issue that is common to embodiment phenomena (Hu et al., 2016; Johnson et al., 2014; Liu & Liao, 2018). For example, following their failure to replicate both moral licensing and cleansing effects, Rotella and Barclay (2020) proposed that neither effect is likely to be elicited online. Therefore, when considered in the context of existing literature, our findings highlight the need for further research to explore claims about the role of moral cleansing in promoting affiliation among those who attend to others' pain. We suggest that consideration should be given to the influence of contextual factors, such as how moral an act is perceived (Mazar & Zhong, 2010), the relatedness between an act and the opportunity to make a moral choice (Lee & Hsieh, 2013), the emphasis placed on the benefits of moral decisions (T. Garcia et al., 2020), and opportunities to establish a moral reputation (Rotella & Barclay, 2020).

Our findings are significant in several ways. First, our findings add to theoretical understanding of human pain. For example, they support a physical-social pain overlap (e.g., Eisenberger, 2012a; Eisenberger & Lieberman, 2004), in which physical and social pain exist as separate but overlapping constructs that result in common psychosocial outcomes. Second, our findings advance understanding of the social significance of pain in contemporary online contexts. Previous studies have found that emotional arousal and valence influence the social transmission of online content (Berger & Milkman, 2012; Nikolinakou & King, 2018). However, there is still little known about why online content becomes viral and its impact on individual attendees. Our findings suggest that painful online content commands more of our collective attention and draws us together. One possibility is that the sense of social connection generated by collectively attending to others' pain online also increases its social transmission. Third, our findings give insight into how social processes known to mediate face-to-face social interactions operate in online contexts. Our findings specifically support the idea that shared experiences transcend physical spaces to emerge in online experiences.

## 4 | GENERAL DISCUSSION

Pain, in its various forms, has traditionally been regarded as an aversive experience to be reduced or eradicated (Global Industry Analysts, 2012). Indeed, many collective action problems encompass the pain of others, such as ongoing intergroup conflicts (Whitehouse et al., 2017), acts of terror (Drury et al., 2009; Jong et al., 2015), natural disasters (Rodríguez et al., 2006; Vezzali et al., 2016), and pandemics (Van Bavel et al., 2020). However, evidence continues to suggest that pain is, in fact, also associated with positive biological, psychological, and social outcomes (for a review see Bastian, Jetten, Hornsey & Leknes, 2014). In this vein, some researchers have argued that pain is also a specific, biologically rooted experience that is particularly powerful in binding groups together (Fischer & Xygalatas, 2014). Our aim was to explore the emergence of affiliative attitudes and behaviors between those who collectively attend to others' pain online and to understand the mechanisms that mediate

such responses. Across the studies reported, we found evidence supporting the idea that collectively attending to others' pain is a potent form of shared experience, even online. More specifically, we found evidence to suggest that merely attending to others' physical or social pain online indirectly promotes affiliation among co-attendees via the perception of emotional synchrony. More so than ever, due to health concerns associated with mass physical gatherings, online social networks represent important venues for social sharing and connection (Rimé et al., 2020), moral and political discourse, and raising awareness of social issues (Brady et al., 2020). Our findings therefore help advance practical understanding of how the mass diffusion of physical and social pain via online mediums might be harnessed to bond together geographically dispersed co-attendees.

For example, our findings align with the working hypothesis proposed by Whitehouse (2021) that widely shared sufferings resulting from the COVID-19 pandemic bond individuals together and change patterns of identity fusion between previously divided groups. Social distancing measures during the pandemic have disrupted the frequency and quality of experiences shared face-to-face, threatening the human need for social connection (Aleman & Sommer, 2022; Rogers & Cruickshank, 2021). Further, the pandemic has placed significant psychological burden on individuals by requiring large-scale prosocial action to protect vulnerable populations (Bavel et al., 2020). Our findings suggest that one way to address these issues is through sharing personal experiences of suffering online. Rogers and Cruickshank (2021) reported that during highly restrictive lockdown periods in Australia, 94% of people surveyed talked with others about COVID-19 at least a few times per week. Our findings specifically suggest that the act of collectively attending to others' pandemic-related-pain online is likely to generate the perception of a shared emotional response, which in-turn may promote large-scale bonding among physically dispersed co-attendees. Other preliminary work also suggests that threat-evoked perceived emotional synchrony is related to increased solidarity (among liberals) and adherence to shared beliefs (among conservatives) in the context of the COVID-19 pandemic (Bouchat, Metzler et al., 2020). Expanding on our findings, encouragement of continued communication following a collective attention state, such as within the comments sections of social media posts, may help to convert interpersonal bonds into sustained prosocial motivations (Buhrmester et al., 2018; Drewery, 2022; D. Garcia & Rime, 2019).

Although promising, our findings represent a preliminary investigation subject to limitations and requiring further replication. The studies we reported here were associated with modest sample sizes due to resourcing constraints. Also of consideration is the use of short-item self-report measures in both studies, some of which may have been subject to intraindividual interpretation. For example, ratings from the single-item self-report measure of collective attention used in Study 1 may be alternately interpreted as an attention check to the instruction that the video was being watched by other students or considered to reflect individual as opposed to collective attention. Asking individuals to instead rate the nature of their attention on a continuum anchored by *I was attending alone* and *we were attending together* may better differentiate between perceptions of individual and collective attention to others' pain online. Relatedly, multi-item versions of in-the-moment personal attention and self-reflection measures in Study 2 may assist in clarifying whether different kinds of self-attentiveness (e.g., reflection or intellectual self-attentiveness; Jong et al., 2015; Trapnell & Campbell, 1999), aspects of the nature of memory (e.g., episodicity, emotionality, specificity, accuracy, centrality), or types of memory processing (e.g., narrative processing, reconstruction, reflection; van Mulukom, 2017) feature differently in the relationship between shared pain and interpersonal bonding. Further, little insight can be drawn from the single-item measure of moral salience in Study 2 regarding the particular moral traits elicited when collectively attending to others' pain (e.g., guilt, sincerity, honesty, trustworthiness; Baldwin et al., 1990; Brambilla et al., 2011, 2012; Krakowiak & Tsay-Vogel, 2015). It could also be argued that moral salience is instead better assessed using implicit measures, such as moral word-completion tasks (e.g., ral could be completed by moral; Gino et al., 2011; Shu et al., 2012). For these reasons, well-powered replication of reported effects using theoretically sound and psychometrically validated measures is required to confirm their stability. Several other considerations are also relevant to the future directions of the findings we have reported.

For example, we primed participants with their shared university attendance across all experimental conditions in both studies. As a result, the observed effects of collectively attending to others' pain appear to extend beyond known affiliative responses to shared identity (Hein et al., 2010; Stürmer et al., 2006). There is some evidence to suggest that prior social bonds are a prerequisite for the perception of emotional synchrony during collective experiences (Boothby et al., 2016; Konvalinka et al., 2011; Xygalatas et al., 2011) and that interpersonal synchrony is most pronounced when coupled with shared intentionality (Reddish et al., 2013). However, other work has reported no difference in perceived emotional synchrony when shared identity is low as opposed to high in online contexts (Drewery, 2022). Thus, more work is needed exploring reported effects among strangers to better understand the importance of prior social bonds between co-attendees.

Findings from both studies reported are further premised upon collective, as opposed to individual, attention online. Indeed, collective attention is ubiquitous in the contemporary world (Shteynberg, 2015). However, it is unclear whether the observed effects of collectively attending to others' pain are contingent upon knowledge of co-attention. Therefore, exploration of our findings among individuals who are both aware and unaware of the existence of co-attendees is also encouraged. For example, empathy following individual attention to others' pain has been shown to increase monetary offers towards strangers (Barraza & Zak, 2009) and caring for unrelated stigmatized group members (Cargile, 2016). On this basis, both individual and collective attention to others' pain online may be expected to promote a generalized state of empathy-induced affiliation towards others. However, some work suggests that

collective attention to valenced stimuli amplifies emotional reactions relative to individual attention (Boothby et al., 2014, 2017; Shteynberg et al., 2014). On this basis, we theorize that empathy-induced-affiliation is strongest following collective attention to others' pain.

In sum, we have presented novel evidence for the emergence of affiliative attitudes among those who collectively attend to others' personal experiences of pain online. Despite these and other similar findings, more work is needed to develop a complete model of the circumstances under which collectively attending to others' pain motivates individuals to affiliate with one another. Of particular interest are the necessity of preexisting social ties among co-attendees, the exact nature of perceived emotional synchrony mediating affiliative outcomes, how to convert affiliative attitudes into prosocial actions, and the longevity of affiliative outcomes. To keep pace with the evolution of technology-mediated social interaction, further exploration of our findings is also required to identify meaningful, practical implications in online contexts. That is, to understand how pain shared in real-world online contexts may be harnessed to increase social connection and well-being.

## ACKNOWLEDGMENT

The authors have no acknowledgments to make at this time. Jessie Mitchell was supported by a Griffith University Postgraduate Research Scholarship. Open access publishing facilitated by Griffith University, as part of the Wiley - Griffith University agreement via the Council of Australian University Librarians.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ORCID

*Jessie Mitchell* http://orcid.org/0000-0002-5890-5764
*Stefano Occhipinti* http://orcid.org/0000-0002-2558-0609
*Megan Oaten* http://orcid.org/0000-0001-8855-219X

## REFERENCES

Aleman, A., & Sommer, I. (2022). The silent danger of social distancing. *Psychological Medicine*, *52*(4), 789–790. https://doi.org/10.1017/S0033291720002597

Aronson, E., & Mills, J. (1959). The effect of severity of initiation on liking for a group. *The Journal of Abnormal and Social Psychology*, *59*(2), 177–181. https://doi.org/10.1037/h0047195

Ashton-James, C. E., Richardson, D. C., Williams, A. C. C., Bianchi-Berthouze, N., & Dekker, P. H. (2014). Impact of pain behaviors on evaluations of warmth and competence. *Pain*, *155*(12), 2656–2661. https://doi.org/10.1016/j.pain.2014.09.031

Atkinson, Q. D., & Whitehouse, H. (2011). The cultural morphospace of ritual form. *Evolution and Human Behavior*, *32*(1), 50–62. https://doi.org/10.1016/j.evolhumbehav.2010.09.002

Bagrow, J. P., Wang, D., & Barabási, A. L. (2011). Collective response of human populations to large-scale emergencies. *PLoS One*, *6*(3), e17680. https://doi.org/10.1371/journal.pone.0017680

Baldwin, M. W., Carrell, S. E., & Lopez, D. F. (1990). Priming relationship schemas: My advisor and the pope are watching me from the back of my mind. *Journal of Experimental Social Psychology*, *26*, 435–454.

Baranowski-Pinto, G., Profeta, V. L. S., Newson, M., Whitehouse, H., & Xygalatas, D. (2022). Being in a crowd bonds people via physiological synchrony. *Scientific Reports*, *12*(1), 613. https://doi.org/10.1038/s41598-021-04548-2

Barraza, J. A., & Zak, P. J. (2009). Empathy toward strangers triggers oxytocin release and subsequent generosity. *Annals of the New York Academy of Sciences*, *1167*(1), 182–189. https://doi.org/10.1111/j.1749-6632.2009.04504.x

Bastian, B., Jetten, J., & Fasoli, F. (2011). Cleansing the soul by hurting the flesh: The guilt-reducing effect of pain. *Psychological Science*, *22*(3), 334–335. https://doi.org/10.1177/0956797610397058

Bastian, B., Jetten, J., & Ferris, L. J. (2014). Pain as social glue: Shared pain increases cooperation. *Psychological Science*, *25*(11), 2079–2085. https://doi.org/10.1177/0956797614545886

Bastian, B., Jetten, J., Hornsey, M. J., & Leknes, S. (2014). The positive consequences of pain: A biopsychosocial approach. *Personality and Social Psychology Review*, *18*(3), 256–279. https://doi.org/10.1177/1088868314527831

Bastian, B., Jetten, J., Thai, H. A., & Steffens, N. K. (2018). Shared adversity increases team creativity through fostering supportive interaction. *Frontiers in Psychology*, *9*, 2309. https://doi.org/10.3389/fpsyg.2018.02309

Batson, C. D., Early, S., & Salvarani, G. (1997). Perspective taking: Imagining how another feels versus imaging how you would feel. *Personality and Social Psychology Bulletin*, *23*(7), 751–758. https://doi.org/10.1177/0146167297237008

Batson, C. D., Fultz, J., & Schoenrade, P. A. (1987). Distress and empathy: Two qualitatively distinct vicarious emotions with different motivational consequences. *Journal of Personality*, *55*(1), 19–39. https://doi.org/10.1111/j.1467-6494.1987.tb00426.x

Batson, C. D., & Shaw, L. L. (1991). Evidence for altruism: Toward a pluralism of prosocial motives. *Psychological Inquiry*, *2*(2), 107–122. https://doi.org/10.1207/s15327965pli0202_1

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497

Bavel, J. J. V., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M. J., Crum, A. J., Douglas, K. M., Druckman, J. N., Drury, J., Dube, O., Ellemers, N., Finkel, E. J., Fowler, J. H., Gelfand, M., Han, S., Haslam, S. A., Jetten, J., … Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour*, *4*, 460–471. https://doi.org/10.31234/osf.io/y38m9

Bayet, S., Bushnell, M. C., & Schweinhardt, P. (2014). Emotional faces alter pain perception. *European Journal of Pain*, *18*(5), 712–720. https://doi.org/10.1002/j.1532-2149.2013.00408.x

Berger, J., & Milkman, K. L. (2012). What makes online content viral? *Journal of Marketing Research*, *49*(2), 192–205. https://doi.org/10.1509/jmr.10.0353

Bocian, K., & Baryla, W. (2020). Pain(less) cleansing: Watching other people in pain reduces guilt and sadness but not shame. *PLoS One*, *15*(12), e0244429. https://doi.org/10.1371/journal.pone.0244429

Boothby, E. J., Clark, M. S., & Bargh, J. A. (2014). Shared experiences are amplified. *Psychological Science*, *25*(12), 2209–2216. https://doi.org/10.1177/0956797614551162

Boothby, E. J., Smith, L. K., Clark, M. S., & Bargh, J. A. (2016). Psychological distance moderates the amplification of shared experience.

*Personality and Social Psychology Bulletin*, *42*(10), 1431–1444. https://doi.org/10.1177/0146167216662869

Boothby, E. J., Smith, L. K., Clark, M. S., & Bargh, J. A. (2017). The world looks better together: How close others enhance our visual experiences. *Personal Relationships*, *24*(3), 694–714. https://doi.org/10.1111/pere.12201

Bouchat, P., Metzler, H., & Rimé, B. (2020). Crise et pandémie. Impact émotionnel et psychosocial du confinement. *Le Journal des psychologues*, *380*(8), 14–20. https://doi.org/10.3917/jdp.380.0014

Bouchat, P., Rimé, B., Van Eycken, R., & Nils, F. (2020). The virtues of collective gatherings: A study on the positive effects of a major scouting event. *Journal of Applied Social Psychology*, *50*(3), 189–201. https://doi.org/10.1111/jasp.12649

Brady, W. J., Crockett, M. J., & Van Bavel, J. J. (2020). The MAD model of moral contagion: The role of motivation, attention, and design in the spread of moralized content online. *Perspectives on Psychological Science*, *15*(4), 978–1010. https://doi.org/10.1177/1745691620917336

Brambilla, M., Rusconi, P., Sacchi, S., & Cherubini, P. (2011). Looking for honesty: The primary role of morality (vs. sociability and competence) in information gathering. *European Journal of Social Psychology*, *41*(2), 135–143. https://doi.org/10.1002/ejsp.744

Brambilla, M., Sacchi, S., Rusconi, P., Cherubini, P., & Yzerbyt, V. Y. (2012). You want to give a good impression? Be honest! Moral traits dominate group impression formation: Moral traits dominate group impression formation. *British Journal of Social Psychology*, *51*(1), 149–166. https://doi.org/10.1111/j.2044-8309.2010.02011.x

Brandt, M. J., & Reyna, C. (2011). The chain of being: A hierarchy of morality. *Perspectives on Psychological Science*, *6*(5), 428–446. https://doi.org/10.1177/1745691611414587

Brewer, M. B., & Kramer, R. M. (1986). Choice behavior in social dilemmas: Effects of social identity, group size, and decision framing. *Journal of Personality and Social Psychology*, *50*(3), 543–549. https://doi.org/10.1037/0022-3514.50.3.543

Buhrmester, M. D., Burnham, D., Johnson, D. D. P., Curry, O. S., Macdonald, D. W., & Whitehouse, H. (2018). How moments become movements: Shared outrage, group cohesion, and the lion that went viral. *Frontiers in Ecology and Evolution*, *6*, 54. https://doi.org/10.3389/fevo.2018.00054

Bulbulia, J. A., Xygalatas, D., Schjoedt, U., Fondevila, S., Sibley, C. G., & Konvalinka, I. (2013). Images from a jointly-arousing collective ritual reveal affective polarization. *Frontiers in Psychology*, *4*, 960. https://doi.org/10.3389/fpsyg.2013.00960

van Bunderen, L., & Bastian, B. (2014). "I have paid my dues": When physical pain reduces interpersonal justice motivations. *Motivation and Emotion*, *38*(4), 540–546. https://doi.org/10.1007/s11031-014-9403-8

Campbell, D. T. (1958). Common fate, similarity, and other indices of the status of aggregates of persons as social entities. *Behavioral Science*, *3*(1), 14–25. https://doi.org/10.1002/bs.3830030103

Cargile, A. C. (2016). Can empathy improve concern for secondary group members? Testing an emotionally engaging video intervention. *Communication Research Reports*, *33*(3), 265–268. https://doi.org/10.1080/08824096.2016.1186623

Chou, W.-Y. S., Hunt, Y., Folkers, A., & Augustson, E. (2011). Cancer survivorship in the age of YouTube and social media: A narrative analysis. *Journal of Medical Internet Research*, *13*(1), e7. https://doi.org/10.2196/jmir.1569

Coleman, M. D. (2018). Emotion and the false consensus effect. *Current Psychology*, *37*, 58–64. https://doi.org/10.1007/s12144-016-9489-0

Collins, R. (2014). Interaction ritual chains and collective effervescence. In C. V. Scheve & M. Salmela (Eds.), *Collective emotions* (pp. 299–311). Oxford University Press.

Craig, K. D. (2009). The social communication model of pain. *Canadian Psychology/Psychologie canadienne*, *50*(1), 22–32. https://doi.org/10.1037/a0014772

Craig, K. D., Versloot, J., Goubert, L., Vervoort, T., & Crombez, G. (2010). Perceiving pain in others: Automatic and controlled mechanisms. *The Journal of Pain*, *11*(2), 101–108. https://doi.org/10.1016/j.jpain.2009.08.008

Crombez, G., Eccleston, C., Baeyens, F., & Eelen, P. (1997). Habituation and the interference of pain with task performance. *Pain*, *70*(2), 149–154. https://doi.org/10.1016/S0304-3959(96)03304-0

Cui, X., Rui, J., & Su, F. (2016). From immediate community to imagined community: Social identity and the co-viewing of media event. *Global Media and China*, *1*(4), 481–496. https://doi.org/10.1177/2059436416681177

Dakin, B. C., Laham, S. M., Tan, N. P. J., & Bastian, B. (2021). Searching for meaning is associated with costly prosociality. *PLoS One*, *16*(10), e0258769. https://doi.org/10.1371/journal.pone.0258769

De Domenico, M., & Altmann, E. G. (2020). Unraveling the origin of social bursts in collective attention. *Scientific Reports*, *10*(1), 4629. https://doi.org/10.1038/s41598-020-61523-z

DeWall, C. N., MacDonald, G., Webster, G. D., Masten, C. L., Baumeister, R. F., Powell, C., Combs, D., Schurtz, D. R., Stillman, T. F., Tice, D. M., & Eisenberger, N. I. (2010). Acetaminophen reduces social pain: Behavioral and neural evidence. *Psychological Science*, *21*(7), 931–937. https://doi.org/10.1177/0956797610374741

Döveling, K., & Wasgien, K. (2015). Suffering in online interactions. In R. Anderson (Ed.), *World suffering and quality of life. Social indicators research series* (Vol. 56). Springer. https://doi.org/10.1007/978-94-017-9670-5_24

Downey, G. (2007). Producing pain: Techniques and technologies in no-holds-barred fighting. *Social Studies of Science*, *37*(2), 201–226. https://doi.org/10.1177/0306312706072174

Drewery, D. (2022). Perceived emotional synchrony in virtual watch parties University of Waterloo]. UWSpace. http://hdl.handle.net/10012/18087

Drury, J., Cocking, C., & Reicher, S. (2009). The nature of collective resilience: Survivor reactions to the 2005 London bombings. *International Journal of Mass Emergencies and Disasters*, *27*(1), 66–95. http://ijmed.org/articles/113/

Durkheim, E. (1915). In J. W. Swain, *The elementary forms of the religious life*. George Allen and Unwin (original work published 1912).

Earp, B. D., Everett, J. A. C., Madva, E. N., & Hamlin, J. K. (2014). Out, damned spot: Can the "macbeth effect" be replicated? *Basic and Applied Social Psychology*, *36*(1), 91–98. https://doi.org/10.1080/01973533.2013.856792

Eccleston, C., & Crombez, G. (1999). Pain demands attention: A cognitive-affective model of the interruptive function of pain. *Psychological Bulletin*, *125*(3), 356–366. https://doi.org/10.1037/0033-2909.125.3.356

Egnoto, M. J., Sirianni, J. M., Ortega, C. R., & Stefanone, M. (2014). Death on the digital landscape: A preliminary investigation into the grief process and motivations behind participation in the online memoriam. *OMEGA—Journal of Death and Dying*, *69*(3), 283–304. https://doi.org/10.2190/OM.69.3.d

Eisenberger, N. I. (2012). The pain of social disconnection: Examining the shared neural underpinnings of physical and social pain. *Nature Reviews Neuroscience*, *13*(6), 421–434. https://doi.org/10.1038/nrn3231

Eisenberger, N. I. (2012a). Broken hearts and broken bones: A neural perspective on the similarities between social and physical pain. *Current Directions in Psychological Science*, *21*(1), 42–47. https://doi.org/10.1177/0963721411429455

Eisenberger, N. I. (2012b). The neural bases of social pain: Evidence for shared representations with physical pain. *Psychosomatic Medicine*, *74*(2), 126–135. https://doi.org/10.1097/PSY.0b013e3182464dd1

Eisenberger, N. I. (2015). Social pain and the brain: Controversies, questions, and where to go from here. *Annual Review of Psychology*, *66*(1), 601–629. https://doi.org/10.1146/annurev-psych-010213-115146

Eisenberger, N. I., Jarcho, J. M., Lieberman, M. D., & Naliboff, B. D. (2006). An experimental study of shared sensitivity to physical pain and social rejection. *Pain*, *126*(1), 132–138. https://doi.org/10.1016/j.pain.2006.06.024

Eisenberger, N. I., & Lieberman, M. D. (2004). Why rejection hurts: A common neural alarm system for physical and social pain. *Trends in Cognitive Sciences*, *8*(7), 294–300. https://doi.org/10.1016/j.tics.2004.05.010

Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science*, *302*(5643), 290–292. https://doi.org/10.1126/science.1089134

Elder, G. H., & Clipp, E. C. (1989). Combat experience and emotional health: Impairment and resilience in later life. *Journal of Personality*, *57*(2), 311–341. https://doi.org/10.1111/j.1467-6494.1989.tb00485.x

Fayard, J. V., Bassi, A. K., Bernstein, D. M., & Roberts, B. W. (2009). Is cleanliness next to godliness? Dispelling old wives' tales: failure to replicate Zhong and Liljenquist (2006). *Journal of Articles in Support of the Null Hypothesis*, *6*(2), 21–28.

Feldman, R. (2012). Oxytocin and social affiliation in humans. *Hormones and Behavior*, *61*(3), 380–391. https://doi.org/10.1016/j.yhbeh.2012.01.008

Festinger, L. (1959). *A theory of cognitive dissonance*. Tavistock Publications.

Fischer, R., & Xygalatas, D. (2014). Extreme rituals as social technologies. *Journal of Cognition and Culture*, *14*(5), 345–355. https://doi.org/10.1163/15685373-12342130

Fischer, R., Xygalatas, D., Mitkidis, P., Reddish, P., Tok, P., Konvalinka, I., & Bulbulia, J. (2014). The fire-walker's high: Affect and physiological responses in an extreme collective ritual. *PLoS One*, *9*(2), e88355. https://doi.org/10.1371/journal.pone.0088355

Garcia, D., & Rime, B. (2019). Collective emotions and social resilience in the digital traces after a terrorist attack. *Psychological Science*, *30*(4), 617–628. https://doi.org/10.1177/0956797619831964

Garcia, T., Massoni, S., & Villeval, M. C. (2020). Ambiguity and excuse-driven behavior in charitable giving. *European Economic Review*, *124*, 103412. https://doi.org/10.1016/j.euroecorev.2020.103412

van Gennep, A. (1960). In M. B. Vizedom & G. L. Caffee (Eds.), *The rites of passage*. University of Chicago Press (original work published 1908).

Giaxoglou, K., Döveling, K., & Pitsillides, S. (2017). Networked emotions: Interdisciplinary perspectives on sharing loss online. *Journal of Broadcasting & Electronic Media*, *61*(1), 1–10. https://doi.org/10.1080/08838151.2016.1273927

Giesen, A., & Echterhoff, G. (2018). Do I Really Feel Your Pain? Comparing the Effects of Observed and Personal Ostracism. *Personality and Social Psychology Bulletin*, *44*(4), 550–561. https://doi.org/10.1177/0146167217744524

Gino, F., Schweitzer, M. E., Mead, N. L., & Ariely, D. (2011). Unable to resist temptation: How self-control depletion promotes unethical behavior. *Organizational Behavior and Human Decision Processes*, *115*(2), 191–203. https://doi.org/10.1016/j.obhdp.2011.03.001

Global Industry Analysts. (2012). *Pain management: A global strategic business report*. http://www.strategyr.com/Pain_Management_Market_Report.asp

Goldenberg, A., & Gross, J. J. (2020). Digital emotion contagion. *Trends in Cognitive Sciences*, *24*(4), 316–328. https://doi.org/10.1016/j.tics.2020.01.009

Gonzalez-Polledo, E., & Tarr, J. (2016). The thing about pain: The remaking of illness narratives in chronic pain expressions on social media. *New Media & Society*, *18*(8), 1455–1472. https://doi.org/10.1177/1461444814560126

Güth, W. (2010). The generosity game and calibration of inequity aversion. *The Journal of Socio-Economics*, *39*(2), 155–157. https://doi.org/10.1016/j.socec.2009.10.012

Güth, W., Levati, M. V., & Ploner, M. (2012). An experimental study of the generosity game. *Theory and Decision*, *72*, 51–63. https://doi.org/10.1007/s11238-011-9253-8

Hadjistavropoulos, T., Craig, K. D., Duck, S., Cano, A., Goubert, L., Jackson, P. L., Mogil, J. S., Rainville, P., Sullivan, M. J. L., Williams, A. C. C., Vervoort, T., & Fitzgerald, T. D. (2011). A biopsychosocial formulation of pain communication. *Psychological Bulletin*, *137*(6), 910–939. https://doi.org/10.1037/a0023876

Haj-Mohamadi, P., Fles, E. H., & Shteynberg, G. (2018). When can shared attention increase affiliation? On the bonding effects of co-experienced belief affirmation. *Journal of Experimental Social Psychology*, *75*, 103–106. https://doi.org/10.1016/j.jesp.2017.11.007

Han, E., & Lee, S.-W. (2014). Motivations for the complementary use of text-based media during linear TV viewing: An exploratory study. *Computers in Human Behavior*, *32*, 235–243. https://doi.org/10.1016/j.chb.2013.12.015

Haridakis, P., & Hanson, G. (2009). Social interaction and co-viewing with YouTube: Blending mass communication reception and social connection. *Journal of Broadcasting & Electronic Media*, *53*(2), 317–335. https://doi.org/10.1080/08838150902908270.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Publications.

Hayes, A. F., & Preacher, K. J. (2013). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology*, *67*(3), 451–470. https://doi.org/10.1111/bmsp.12028

Hein, G., Silani, G., Preuschoff, K., Batson, C. D., & Singer, T. (2010). Neural responses to ingroup and outgroup members' suffering predict individual differences in costly helping. *Neuron*, *68*(1), 149–160. https://doi.org/10.1016/j.neuron.2010.09.003

Hermida, A. (2014). Twitter as an ambient news network. In K. Weller, A. Burns, J. Burgess, M. Mahrt, & C. Puschmann (Eds.), *Twitter and society* (pp. 359–373). Peter Lang.

Hopkins, N., Reicher, S. D., Khan, S. S., Tewari, S., Srinivasan, N., & Stevenson, C. (2016). Explaining effervescence: Investigating the relationship between shared social identity and positive experience in crowds. *Cognition and Emotion*, *30*(1), 20–32. https://doi.org/10.1080/02699931.2015.1015969

Hopkins, N., Reicher, S., Stevenson, C., Pandey, K., Shankar, S., & Tewari, S. (2019). Social relations in crowds. *European Journal of Social Psychology*, *49*(6), 1283–1297. https://doi.org/10.1002/ejsp.2586

Hu, C., Wang, F., Guo, J., Song, M., Sui, J., & Peng, K. (2016). The replication crisis in psychological research. *Advances in Psychological Science*, *24*(9), 1504–1518. https://doi.org/10.3724/SP.J.1042.2016.01504

Hwang, H. (2015). Moral reminder as a way to improve worker performance on Amazon Mechanical Turk [Paper presentation]. Third AAAI Conference on Human Computation and Crowdsourcing, California, United States, November 8–11. https://www.aaai.org/ocs/index.php/HCOMP/HCOMP15/paper/view/11620

Inbar, Y., Pizarro, D. A., Gilovich, T., & Ariely, D. (2013). Moral masochism: On the connection between guilt and self-punishment. *Emotion*, *13*(1), 14–18. https://doi.org/10.1037/a0029749

Johnson, D. J., Cheung, F., & Donnellan, M. B. (2014). Does cleanliness influence moral judgments?: A direct replication of. *Social Psychology*, *45*(3), 209–215. https://doi.org/10.1027/1864-9335/a000186

Jong, J., Whitehouse, H., Kavanagh, C., & Lane, J. (2015). Shared negative experiences lead to identity fusion via personal reflection. *PLoS One*, *10*(12), e0145611. https://doi.org/10.1371/journal.pone.0145611

Kapitány, R., Kavanagh, C., Buhrmester, M. D., Newson, M., & Whitehouse, H. (2020). Ritual, identity fusion, and the inauguration of president Trump: A pseudo-experiment of ritual modes theory. *Self and Identity*, *19*(3), 293–323. https://doi.org/10.1080/15298868.2019.1578686

Kavanagh, C. M., Jong, J., McKay, R., & Whitehouse, H. (2019). Positive experiences of high arousal martial arts rituals are linked to identity fusion and costly pro-group actions. *European Journal of Social Psychology*, *49*(3), 461–481. https://doi.org/10.1002/ejsp.2514

Khan, S. S., Hopkins, N., Reicher, S., Tewari, S., Srinivasan, N., & Stevenson, C. (2016). How collective participation impacts social identity: A longitudinal study from India. *Political Psychology*, *37*(3), 309–325. https://doi.org/10.1111/pops.12260

Konvalinka, I., Xygalatas, D., Bulbulia, J., Schjødt, U., Jegindø, E.-M., Wallot, S., Van Orden, G., & Roepstorff, A. (2011). Synchronized arousal between performers and related spectators in a fire-walking ritual. *Proceedings of the National Academy of Sciences*, *108*(20), 8514–8519. https://doi.org/10.1073/pnas.1016955108

Konvalinka, I., Xygalatas, D., Geertz, A. W., Roepstoff, A., Jegindø, E.-M., Schjoedt, U., Bulbulia, J., & Reddish, P. (2013). Autobiographical memory in a fire-walking ritual. *Journal of Cognition and Culture*, *13*(1–2), 1–16. https://doi.org/10.1163/15685373-12342081

Krakowiak, K. M., & Tsay-Vogel, M. (2015). The dual role of morally ambiguous characters: Examining the effect of morality salience on narrative responses. *Human Communication Research*, *41*, 390–411. https://doi.org/10.1111/hcre.12050

Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science*, *14*(4), 334–339. https://doi.org/10.1111/1467-9280.14481

Leach, C. W., Ellemers, N., & Barreto, M. (2007). Group virtue: The importance of morality (vs. competence and sociability) in the positive evaluation of in-groups. *Journal of Personality and Social Psychology*, *93*(2), 234–249. https://doi.org/10.1037/0022-3514.93.2.234

Lee, Y.-H., & Hsieh, G. (2013). Does slacktivism hurt activism?: The effects of moral balancing and consistency in online activism [Paper presentation]. SIGCHI Conference on Human Factors in Computing Systems, Paris, France, April 27-May 2. https://doi.org/10.1145/2470654.2470770

Lehmann, J., Gonçalves, B., Ramasco, J. J., & Cattuto, C. (2012). Dynamical classes of collective attention in Twitter [Paper presentation]. 21st International Conference on World Wide Web, New York, United States, April. https://doi.org/10.1145/2187836.2187871

Lieberman, M. D., & Eisenberger, N. I. (2006). A pain, by any other name (rejection, exclusion, ostracism), still hurts the same: The role of dorsal anterior cingulate cortex in social and physical pain. In J. T. Cacioppo, P. S. Visser, & C. L. Pickett (Eds.), *Social neuroscience: People thinking about people* (pp. 169–187). MIT Press.

Liljenquist, K., Zhong, C.-B., & Galinsky, A. D. (2010). The smell of virtue: Clean scents promote reciprocity and charity. *Psychological Science*, *21*(3), 381–383. https://doi.org/10.1177/0956797610361426

Lin, Y.-R., Keegan, B., Margolin, D., & Lazer, D. (2014). Rising tides or rising stars? Dynamics of shared attention on Twitter during media events. *PLoS One*, *9*(5), e94093. https://doi.org/10.1371/journal.pone.0094093

Liu, C., & Liao, J. (2018). 具身效应何处寻:解决可重复性危机的分析性途径. *Advances in Psychological Science*, *26*(12), 2260–2271. https://doi.org/10.3724/SP.J.1042.2018.02260

Lobato, R. M., & Sainz, M. (2020). On the way to fusion through the pilgrims' route: Factors that maintain identity fusion in collective rituals. *Group Processes & Intergroup Relations*, *23*(4), 502–518.

MacDonald, G., & Leary, M. R. (2005). Why does social exclusion hurt? The relationship between social and physical pain. *Psychological Bulletin*, *131*(2), 202–223. https://doi.org/10.1037/0033-2909.131.2.202

Madden, M. (2009). The audience for online video-sharing sites shoots up. Pew Research Center. https://www.pewresearch.org/internet/2009/07/29/the-audience-for-online-video-sharing-sites-shoots-up/

Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the "porcupine problem". *Journal of Personality and Social Psychology*, *92*(1), 42–55. https://doi.org/10.1037/0022-3514.92.1.42

Marinović, V., Wahl, S., & Träuble, B. (2017). "Next to you"—Young children sit closer to a person following vicarious ostracism. *Journal of Experimental Child Psychology*, *156*, 179–185. https://doi.org/10.1016/j.jecp.2016.11.011

Marzouki, Y., Aldossari, F. S., & Veltri, G. A. (2021). Understanding the buffering effect of social media use on anxiety during the COVID-19 pandemic lockdown. *Humanities and Social Sciences Communications*, *8*(1), 47. https://doi.org/10.1057/s41599-021-00724-x

Mazar, N., & Zhong, C.-B. (2010). Do green products make us better people? *Psychological Science*, *21*(4), 494–498. https://doi.org/10.1177/0956797610363538

Merriam-Webster. (n.d.). Merriam-Webster.com dictionary. Retrieved July 2, 2020, from https://www.merriam-webster.com/dictionary/affiliate

Merskey, H., & Bogduk, N. (Eds.) The International Association for the Study of Pain Task Force on Taxonomy. (1994). Pain terms: A current list with definitions and notes on usage, *Classification of chronic pain, IASP task force on taxonomy* (2nd ed., pp. 207–213). IASP Press.

Mitkidis, P., Ayal, S., Shalvi, S., Heimann, K., Levy, G., Kyselo, M., Wallot, S., Ariely, D., & Roepstorff, A. (2017). The effects of extreme rituals on moral behavior: The performers-observers gap hypothesis. *Journal of Economic Psychology*, *59*, 1–7. https://doi.org/10.1016/j.joep.2016.12.007

Moreno, M. A., Jelenchick, L. A., Egan, K. G., Cox, E., Young, H., Gannon, K. E., & Becker, T. (2011). Feeling bad on Facebook: Depression disclosures by college students on a social networking site. *Depression and Anxiety*, *28*(6), 447–455. https://doi.org/10.1002/da.20805

Morinis, A. (1985). The ritual experience: Pain and the transformation of consciousness in ordeals of initiation. *Ethos*, *13*(2), 150–174. https://doi.org/10.1525/eth.1985.13.2.02a00040

van Mulukom, V. (2017). Remembering religious rituals: autobiographical memories of high-arousal religious rituals considered from a narrative processing perspective. *Religion, Brain & Behavior*, *7*(3), 191–205. https://doi.org/10.1080/2153599X.2016.1232304

Muzzulini, B., van Mulukom, V., Kapitány, R., & Whitehouse, H. (2021). Shared flashbulb memories lead to identity fusion: Recalling the defeat in the brexit referendum produces strong psychological bonds among remain supporters. *Journal of Applied Research in Memory and Cognition*, *11*(3), 374–383. https://doi.org/10.1016/j.jarmac.2021.10.005

Nelissen, R. M. A. (2011). Guilt-induced self-punishment as a sign of remorse. *Social Psychological and Personality Science*, *3*, 139–144. https://doi.org/10.1177/1948550611411520

Nelissen, R. M. A., & Zeelenberg, M. (2009). When guilt evokes self-punishment: Evidence for the existence of a dobby effect. *Emotion*, *9*(1), 118–122. https://doi.org/10.1037/a0014540

Neubaum, G., Rösner, L., Rosenthal-von der Pütten, A. M., & Krämer, N. C. (2014). Psychosocial functions of social media usage in a disaster situation: A multi-methodological approach. *Computers in Human Behavior*, *34*, 28–38. https://doi.org/10.1016/j.chb.2014.01.021

Nikolinakou, A., & King, K. W. (2018). Viral video ads: Emotional triggers and social media virality. *Psychology & Marketing*, *35*(10), 715–726. https://doi.org/10.1002/mar.21129

Nuñez, T. R., Radtke, T., & Eimler, S. C. (2020). A third-person perspective on phubbing: Observing smartphone-induced social exclusion generates negative affect, stress, and derogatory attitudes. *Cyberpsychology*, *14*(3), 3. https://doi.org/10.5817/cp2020-3-3

Olivola, C. Y., & Shafir, E. (2013). The martyrdom effect: When pain and effort increase prosocial contributions. *Journal of Behavioral Decision Making*, *26*(1), 91–105. https://doi.org/10.1002/Bdm.767

O'Rourke, H. P., & MacKinnon, D. P. (2018). Reasons for testing mediation in the absence of an intervention effect: A research imperative in prevention and intervention research. *Journal of Studies on Alcohol and Drugs*, *79*(2), 171–181. https://doi.org/10.15288/jsad.2018.79.171

Ouwerkerk, J. W., Kerr, N. L., Gallucci, M., & Van Lange, P. (2005). Avoiding the social death penalty: Ostracism and cooperation in social dilemmas. In K. D. Williams, J. P. Forgas, & W. Von Hippel (Eds.), *The social outcast: Ostracism, social exclusion, rejection, and bullying* (pp. 321–332). The Psychology Press.

Over, H., & Carpenter, M. (2009). Priming third-party ostracism increases affiliative imitation in children. *Developmental science*, *12*(3), F1–F8. https://doi.org/10.1111/j.1467-7687.2008.00820.x

Páez, D., Basabe, N., Ubillos, S., & González-Castro, J. L. (2007). Social sharing, participation in demonstrations, emotional climate, and coping with collective violence after the March 11th Madrid bombings. *Journal of Social Issues*, *63*(2), 323–337. https://doi.org/10.1111/j.1540-4560.2007.00511.x

Páez, D., Rimé, B., Basabe, N., Wlodarczyk, A., & Zumeta, L. (2015). Psychosocial effects of perceived emotional synchrony in collective gatherings. *Journal of Personality and Social Psychology*, *108*(5), 711–729. https://doi.org/10.1037/pspi0000014

Palamar, J. J., & Acosta, P. (2021). Virtual raves and happy hours during COVID-19: New drug use contexts for electronic dance music partygoers. *International Journal of Drug Policy*, *93*, 102904. https://doi.org/10.1016/j.drugpo.2020.102904

Panksepp, J., Herman, B. H., Vilberg, T., Bishop, P., & DeEskinazi, F. G. (1980). Endogenous opioids and social behavior. *Neuroscience and Biobehavioral Reviews*, *4*(4), 473–487. https://doi.org/10.1016/0149-7634(80)90036-6

Pelletier, P. (2018). The pivotal role of perceived emotional synchrony in the context of terrorism: Challenges and lessons learned from the March 2016 attack in Belgium. *Journal of Applied Social Psychology*, *48*(9), 477–487. https://doi.org/10.1111/jasp.12526

Pinel, E. C., Long, A. E., & Crimin, L. A. (2010). I-Sharing and a classic conformity paradigm. *Social Cognition*, *28*(3), 277–289. https://doi.org/10.1521/soco.2010.28.3.277

Pinel, E. C., Long, A. E., Landau, M. J., Alexander, K., & Pyszczynski, T. (2006). Seeing I to I: A pathway to interpersonal connectedness. *Journal of Personality and Social Psychology*, *90*(2), 243–257. https://doi.org/10.1037/0022-3514.90.2.243

Pizarro, J. J., Zumeta, L. N., Bouchat, P., Włodarczyk, A., Rimé, B., Basabe, N., Amutio, A., & Páez, D. (2022). Emotional processes, collective behavior, and social movements: A meta-analytic review of collective effervescence outcomes during collective gatherings and demonstrations. *Frontiers in Psychology*, *13*, 974683. https://doi.org/10.3389/fpsyg.2022.974683.

Poon, K.-T., Jiang, Y., & Teng, F. (2020). Putting oneself in someone's shoes: The effect of observing ostracism on physical pain, social pain, negative emotion, and self-regulation. *Personality and Individual Differences*, *166*, 110217. https://doi.org/10.1016/j.paid.2020.110217

Price, D. D., McGrath, P. A., Rafii, A., & Buckingham, B. (1983). The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. *Pain*, *17*(1), 45–56. https://doi.org/10.1016/0304-3959(83)90126-4

Rae Westbury, H., & Neumann, D. L. (2008). Empathy-related responses to moving film stimuli depicting human and non-human animal targets in negative circumstances. *Biological Psychology*, *78*(1), 66–74. https://doi.org/10.1016/j.biopsycho.2007.12.009

Reddish, P., Fischer, R., & Bulbulia, J. (2013). Let's dance together: Synchrony, shared intentionality and cooperation. *PLoS One*, *8*(8), e71182. https://doi.org/10.1371/journal.pone.0071182

Reddish, P., Tong, E. M. W., Jong, J., Lanman, J. A., & Whitehouse, H. (2016). Collective synchrony increases prosociality towards non-performers and outgroup members. *British Journal of Social Psychology*, *55*(4), 722–738. https://doi.org/10.1111/bjso.12165

Refslund Christensen, D., & Gotved, S. (2014). Online memorial culture: An introduction. *New Review of Hypermedia and Multimedia*, *21*(1–2), 1–9. https://doi.org/10.1080/13614568.2015.988455

Rennung, M., & Göritz, A. S. (2015). Facing sorrow as a group unites. Facing sorrow in a group divides. *PLoS One*, *10*(9), e0136750. https://doi.org/10.1371/journal.pone.0136750

Rennung, M., & Göritz, A. S. (2016). Prosocial consequences of interpersonal synchrony: A meta-analysis. *Zeitschrift für Psychologie*, *224*(3), 168–189. https://doi.org/10.1027/2151-2604/a000252

Richert, R. A., Whitehouse, H., & Stewart, E. (2005). Memory and analogical thinking in high-arousal rituals. In H. Whitehouse & R. N. McCauley (Eds.), *Mind and religion: Psychological and cognitive foundations of religiosity* (pp. 127–145). AltaMira Press.

Rimé, B. (2007). The social sharing of emotion as an interface between individual and collective processes in the construction of emotional climates. *Journal of Social Issues*, *63*(2), 307–322. https://doi.org/10.1111/j.1540-4560.2007.00510.x

Rimé, B., Bouchat, P., Paquot, L., & Giglio, L. (2020). Intrapersonal, interpersonal, and social outcomes of the social sharing of emotion. *Current Opinion in Psychology*, *31*, 127–134. https://doi.org/10.1016/j.copsyc.2019.08.024

Riva, P., Wirth, J. H., & Williams, K. D. (2011). The consequences of pain: The social and physical pain overlap on psychological responses. *European Journal of Social Psychology*, *41*(6), 681–687. https://doi.org/10.1002/ejsp.837

Robbins, J. M., & Krueger, J. I. (2005). Social projection to ingroups and outgroups: A review and meta-analysis. *Personality and Social Psychology Review*, *9*(1), 32–47. https://doi.org/10.1207/s15327957pspr0901_3

Rodríguez, H., Trainor, J., & Quarantelli, E. L. (2006). Rising to the challenges of a catastrophe: The emergent and prosocial behavior following Hurricane Katrina. *The Annals of the American Academy of Political and Social Science*, *604*(1), 82–101. https://doi.org/10.1177/0002716205284677

Rogers, S. L., & Cruickshank, T. (2021). Change in mental health, physical health, and social relationships during highly restrictive lockdown in the COVID-19 pandemic: evidence from Australia. *PeerJ*, *9*, e11767. https://doi.org/10.7717/peerj.11767

Ross, L., Greene, D., & House, P. (1977). The "false consensus effect": An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology*, *13*(3), 279–301. https://doi.org/10.1016/0022-1031(77)90049-X

Rotella, A., & Barclay, P. (2020). Failure to replicate moral licensing and moral cleansing in an online experiment. *Personality and Individual Differences*, *161*, 109967. https://doi.org/10.1016/j.paid.2020.109967

Rothschild, Z. K., Landau, M. J., Keefer, L. A., & Sullivan, D. (2015). Another's punishment cleanses the self: Evidence for a moral cleansing function of punishing transgressors. *Motivation and Emotion*, *39*(5), 722–741. https://doi.org/10.1007/s11031-015-9487-9

Russell, Y. I., Gobet, F., & Whitehouse, H. (2016). Mood, expertise, analogy, and ritual: An experiment using the five-disk Tower of Hanoi. *Religion, Brain & Behavior*, *6*(1), 67–87. https://doi.org/10.1080/2153599X.2014.921861

Sannon, S., Murnane, E. L., Bazarova, N. N., & Gay, G. (2019). *I was really, really nervous posting it*, Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems.

Sasahara, K., Hirata, Y., Toyoda, M., Kitsuregawa, M., & Aihara, K. (2013). Quantifying collective attention from tweet stream. *PLoS One*, *8*(4), e61823. https://doi.org/10.1371/journal.pone.0061823

Schmitt, M. T., & Branscombe, N. R. (2002). The meaning and consequences of perceived discrimination in disadvantaged

and privileged social groups. *European Review of Social Psychology*, *12*(1), 167–199. https://doi.org/10.1080/14792772143000058

Schnall, S., Benton, J., & Harvey, S. (2008). With a clean conscience: Cleanliness reduces the severity of moral judgments. *Psychological Science*, *19*(12), 1219–1222. https://doi.org/10.1111/j.1467-9280.2008.02227.x

Schubert, T. W., & Otten, S. (2002). Overlap of self, ingroup, and outgroup: Pictorial measures of self-categorization. *Self and Identity*, *1*(4), 353–376. https://doi.org/10.1080/152988602760328012

Shariff, A. F., & Norenzayan, A. (2007). God is watching you priming God concepts increases prosocial behavior in an anonymous economic game. *Psychological Science*, *18*(9), 803–809. https://doi.org/10.1111/j.1467-9280.2007.01983.x

Shteynberg, G. (2015). Shared attention. *Perspectives on Psychological Science*, *10*(5), 579–590. https://doi.org/10.1177/1745691615589104

Shteynberg, G., Bramlett, J. M., Fles, E. H., & Cameron, J. (2016). The broadcast of shared attention and its impact on political persuasion. *Journal of Personality and Social Psychology*, *111*(5), 665–673. https://doi.org/10.1037/pspa0000065

Shteynberg, G., Hirsh, J. B., Apfelbaum, E. P., Larsen, J. T., Galinsky, A. D., & Roese, N. J. (2014). Feeling more together: Group attention intensifies emotion. *Emotion*, *14*(6), 1102–1114. https://doi.org/10.1037/a0037697

Shu, L. L., Mazar, N., Gino, F., Ariely, D., & Bazerman, M. H. (2012). Signing at the beginning makes ethics salient and decreases dishonest self-reports in comparison to signing at the end. *Proceedings of the National Academy of Sciences*, *109*(38), 15197–15200. https://doi.org/10.1073/pnas.1209746109

Sjöblom, M., & Hamari, J. (2017). Why do people watch others play video games? An empirical study on the motivations of Twitch users. *Computers in Human Behavior*, *75*, 985–996. https://doi.org/10.1016/j.chb.2016.10.019

Smart Richman, L., & Leary, M. R. (2009). Reactions to discrimination, stigmatization, ostracism, and other forms of interpersonal rejection: A multimotive model. *Psychological Review*, *116*(2), 365–383. https://doi.org/10.1037/a0015250

Smith, A., & Anderson, M. (2018). Social media use in 2018. Pew Research Center. https://www.pewresearch.org/internet/2018/03/01/social-media-use-in-2018/

Smith, E. R., & Mackie, D. M. (2016). Representation and incorporation of close others' responses: The RICOR model of social influence. *Personality and Social Psychology Review*, *20*(4), 311–331. https://doi.org/10.1177/1088868315598256

Song, R., Over, H., & Carpenter, M. (2015). Children draw more affiliative pictures following priming with third-party ostracism. *Developmental Psychology*, *51*(6), 831–840. https://doi.org/10.1037/a0039176

Song, Y., & Xu, R. (2019). Affective ties that bind: Investigating the affordances of social networking sites for commemoration of traumatic events. *Social Science Computer Review*, *37*(3), 333–354. https://doi.org/10.1177/0894439318770960

Sosis, R., & Bressler, E. R. (2003). Cooperation and commune longevity: A test of the costly signaling theory of religion. *Cross-Cultural Research*, *37*(2), 211–239. https://doi.org/10.1177/1069397103251426

Stürmer, S., Snyder, M., Kropp, A., & Siem, B. (2006). Empathy-motivated helping: The moderating role of group membership. *Personality and Social Psychology Bulletin*, *32*(7), 943–956. https://doi.org/10.1177/0146167206287363

Swann, Jr., W. B., Gómez, Á., Seyle, D. C., Morales, J. F., & Huici, C. (2009). Identity fusion: The interplay of personal and social identities in extreme group behavior. *Journal of Personality and Social Psychology*, *96*(5), 995–1011. https://doi.org/10.1037/a0013668

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.

Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology*, *76*(2), 284–304. https://doi.org/10.1037/0022-3514.76.2.284

Turner, B. S., & Wainwright, S. P. (2003). Corps de Ballet: The case of the injured ballet dancer. *Sociology of Health & Illness*, *25*(4), 269–288. https://doi.org/10.1111/1467-9566.00347

Vázquez, A., Gómez, Á., & Swann, W. B. (2017). Do historic threats to the group diminish identity fusion and its correlates. *Self and Identity*, *16*(4), 480–503. https://doi.org/10.1080/15298868.2016.1272485

Vezzali, L., Drury, J., Versari, A., & Cadamuro, A. (2016). Sharing distress increases helping and contact intentions via social identification and inclusion of the other in the self: Children's prosocial behaviour after an earthquake. *Group Processes & Intergroup Relations*, *19*(3), 314–327. https://doi.org/10.1177/1368430215590492

Wesselmann, E. D., Bagg, D., & Williams, K. D. (2009). "I Feel Your Pain": The effects of observing ostracism on the ostracism detection system. *Journal of Experimental Social Psychology*, *45*(6), 1308–1311. https://doi.org/10.1016/j.jesp.2009.08.003

Whitehouse, H. (2004). *Modes of religiosity: A cognitive theory of religious transmission*. AltaMira Press.

Whitehouse, H. (2005). Emotion, memory and religious rituals: An assessment of two theories. In K. Milton & M. Svasek (Eds.), *Mixed emotions: Anthropological studies of feeling* (pp. 91–108). Berg Publishers.

Whitehouse, H. (2012). Ritual, cognition, and evolution. In R. Sun (Ed.), *Grounding social sciences in cognitive sciences* (pp. 265–284). MIT Press.

Whitehouse, H. (2021). From conflict to COVID: How shared experiences shape our world and how they could improve it. *New England Journal of Public Policy*, *33*(2), 7. https://scholarworks.umb.edu/nejpp/vol33/iss2/7

Whitehouse, H., Jong, J., Buhrmester, M. D., Gómez, Á., Bastian, B., Kavanagh, C. M., Newson, M., Matthews, M., Lanman, J. A., McKay, R., & Gavrilets, S. (2017). The evolution of extreme cooperation via shared dysphoric experiences. *Scientific Reports*, *7*, 44292. https://doi.org/10.1038/srep44292

Whitehouse, H., & Lanman, J. A. (2014). The ties that bind us: Ritual, fusion, and identification. *Current Anthropology*, *55*(6), 674–695. https://doi.org/10.1086/678698

Williams, K. D., Govan, C. L., Croker, V., Tynan, D., Cruickshank, M., & Lam, A. (2002). Investigations into differences between social- and cyberostracism. *Group Dynamics: Theory, Research, and Practice*, *6*(1), 65–77. https://doi.org/10.1037/1089-2699.6.1.65

Williams, K. D., & Sommer, K. L. (1997). Social ostracism by coworkers: Does rejection lead to loafing or compensation? *Personality and Social Psychology Bulletin*, *23*(7), 693–706. https://doi.org/10.1177/0146167297237003

Wlodarczyk, A., Zumeta, L., Pizarro, J. J., Bouchat, P., Hatibovic, F., Basabe, N., & Rimé, B. (2020). Perceived emotional synchrony in collective gatherings: Validation of a short scale and proposition of an integrative measure. *Frontiers in Psychology*, *11*, 1721. https://doi.org/10.3389/fpsyg.2020.01721

Wolf, W., Launay, J., & Dunbar, R. I. M. (2016). Joint attention, shared goals and social bonding. *British Journal of Psychology*, *107*(2), 322–337. https://doi.org/10.1111/bjop.12144

Wong, A., Ho, S., Olusanya, O., Antonini, M. V., & Lyness, D. (2021). The use of social media and online communications in times of pandemic COVID-19. *Journal of the Intensive Care Society*, *22*(3), 255–260. https://doi.org/10.1177/1751143720966280

Wu, F., & Huberman, B. A. (2007). Novelty and collective attention. *Proceedings of the National Academy of Sciences*, *104*(45), 17599–17601.

Xygalatas, D. (2008). *Firewalking in Northern Greece: A cognitive approach to high-arousal rituals* (Publication Number uk.bl.ethos.486243) Queen's University Belfast]ET hOS.

Xygalatas, D., Konvalinka, I., Bulbulia, J., & Roepstorff, A. (2011). Quantifying collective effervescence: Heart-rate dynamics at a fire-walking ritual. *Communicative & Integrative Biology*, *4*(6), 735–738. https://doi.org/10.4161/cib.17609

Xygalatas, D., Mitkidis, P., Fischer, R., Reddish, P., Skewes, J., Geertz, A. W., Roepstorff, A., & Bulbulia, J. (2013). Extreme rituals promote prosociality. *Psychological Science*, *24*(8), 1602–1605. https://doi.org/10.1177/0956797612472910

Yamada, M., & Decety, J. (2009). Unconscious affective processing and empathy: An investigation of subliminal priming on the detection of painful facial expressions. *Pain*, *143*(1), 71–75. https://doi.org/10.1016/j.pain.2009.01.028

Zhao, K., Ferguson, E., & Smillie, L. D. (2016). Prosocial personality traits differentially predict egalitarianism, generosity, and reciprocity in economic games. *Frontiers in Psychology*, *7*, 1137. https://doi.org/10.3389/fpsyg.2016.01137

Zhong, C. B., & Liljenquist, K. (2006). Washing away your sins: Threatened morality and physical cleansing. *Science*, *313*(5972), 1451–1452. https://doi.org/10.1126/science.1130726

## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Mitchell, J., Occhipinti, S., & Oaten, M. (2023). The affiliative power of others' pain online. *Journal of Applied Social Psychology*, 53, 308–328. https://doi.org/10.1111/jasp.12941