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Roles of Social Pain and Defense Mechanisms in Response to Social Exclusion: Reply to Panksepp (2005) and Corr (2005)

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In comments on G. MacDonald and M. R. Leary (2005), J. Panksepp (2005) argued for more emphasis on social pain mechanisms, whereas P. J. Corr (2005) argued for more emphasis on physical defense mechanisms. In response to the former, the authors clarify their positions on the topics of anger, the usefulness of rat models, the role of analgesic mechanisms, and basic motivational processes. In response to the latter, the authors clarify their positions on the topics of the relation of social exclusion to fear, the value of the pain affect construct, and the nature of the social pain experience. The authors conclude that consideration of the roles of both social pain and defense mechanisms is essential to best understand human response to social exclusion.

The two sets of comments provided for our article (MacDonald & Leary, 2005) highlight a range of interesting and important issues. To us, the two commentaries can be summarized as each emphasizing the role of one of the two main parts of our ideas on reaction to social exclusion. We view response to exclusion cues as comprising both feelings of pain and highly defensive physical reactions. Whereas Panksepp (2005) argued for the primacy of activity in pain affect circuits in response to social exclusion, Corr (2005) argued for the primacy of defense system activity. As we highlight in the following response to these comments, our view is that the importance of both components must be considered to fully understand the nature of response to social exclusion. In Panksepp's (2005) terms, we are interested in the implications of social exclusion for both *affective experience* and *emotional behaviors*.

In his commentary, Panksepp (2005) focused on emphasizing a greater role for the separation-distress/PANIC system than for general defense systems in response to social exclusion. He justifiably asserted that the PANIC system has been strongly linked with separation-distress responses that are quelled by opioids, even though the evidence he highlighted suggests that fear and aggression are unaffected or even heightened by opioids. Panksepp (2005) noted, "Fear can be provoked by pain, but this is not the same as fearful affect emerging evolutionarily from the same circuits that originally elaborated the experience of pain" (p. 226). Indeed, we agree with this stance and do not wish to argue that the pain system and the fear system are the same. Instead, our argument is that response to social exclusion cues is regulated, at least in part, by two separate but interacting systems. In our view, the pain circuits that Panksepp (2005) highlighted create a sense of aversiveness in response to social exclusion cues (possibly "hurt feelings," as we discuss later) and send signals to the defense system that danger is afoot. In response to these signals of threat, the defense system mobilizes the individual for quick action. In this sense, Panksepp (2005) may be correct that the phenomenological experience of social pain itself is restricted to PANIC circuits. However, consideration of the relation of the PANIC system to other behavior regulation systems, in our view, provides the fullest account of the behavioral implications of these painful feelings. Thus, it may be true that the exclusion–defense link we argue for is more speculative than the exclusion–pain affect link, but it is our view that inclusion of defense mechanisms in our ideas provides the most satisfying account of why exclusion leads to strong behavioral reactions such as aggression.

As Panksepp (2005) noted, our discussion of exclusion-related aggression does not involve much comment on the seemingly related concept of anger. Although it seems reasonable to suggest that consideration of anger may help clarify our ideas on aggression, in fact, we omitted such discussion out of concern that anger may not be strictly related to the form of aggression of interest to us. As we discuss in more detail in response to Corr's (2005) comments, it is our view that response to social exclusion (including aggression) is tied to the flight–fight–freeze system (FFFS), or the avoidance aspect of the defense system. The experience of anger in humans, however, has been tied to approach behavior (Harmon-Jones & Allen, 1998; Harmon-Jones & Sigelman, 2001). This suggests that anger may be more strongly related to appetitive forms of aggression than to more defensive (i.e., fear related) forms of aggression. That is, the experience of anger may be more strongly related to what Panksepp (1998; see also Panksepp & Zellner, 2004) described as the SEEKING system, rather than the RAGE system. Indeed, Panksepp (2005) argued that aggression arising from socially related defensive motives (e.g., protecting young) is opioid mediated but that aggression arising from socially related appetitive motives (e.g., social dominance) is not, suggesting that defensive aggression is more strongly tied to social pain than appetitive aggression. Of course, there are links between defensive and appetitive aggression (Panksepp & Zellner, 2004), so it is not our intention to suggest that anger is completely

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unrelated to rejection-elicited aggression. Nevertheless, given that anger may be more directly related to appetitive aggression than defensive aggression, anger may not be the most useful emotional construct for understanding aggression that is triggered by social exclusion cues. Certainly, defensive aggression is likely to be accompanied by intense emotional experience, perhaps best described as rage or hostility. However, without a clear sense of what the relevant emotional experience is, it seemed wisest to us to focus more closely on the behavioral level of "defensive aggression."

Panksepp (2005) raised two caveats to some of the evidence presented in the target article (MacDonald & Leary, 2005) that were not therein discussed. The first relates to questions over the applicability of rat pup separation responses to other species, which we consider to be a potentially notable limitation. Of course, not all of the animal data we cited are based on the rat model, but those data that are drawn from rats need to be evaluated with some caution. The second is the distinction between peripheral and spinal analgesic mechanisms that adds another layer of complexity to understanding the link between separation and analgesia in nonhuman animals. Again, this is a fair criticism, and it highlights our assertion from our original article that there appears to be a link between inclusion–exclusion and pain sensitivity, but more careful future work with humans (and, as Panksepp, 2005, noted, nonhuman animals) is needed to understand the nature of this relation.

Where we find ourselves in unequivocal agreement with Panksepp (2005) is with the notion that human experience can best be understood only when consideration is given to the basic emotions and motivations that people share with other animals, and with mammals in particular. Like evolutionary psychology, our own field of social psychology has focused extensively on the role of cognitive processes in interpersonal behavior (e.g., Baldwin, 1992). Yet we also know that our highest order reasoning skills, long held to separate humans from mere "animals," are constrained by motivational pressures (Kunda, 1990); logical arguments that do not "feel right" are likely to be rejected. In our analysis, the drive for safety that is shared across numerous species must be considered a primary motivational force in shaping human social behavior, given that this drive frequently interrupts and overrides other motivational programs. More centrally, we believe that the most parsimonious approach to understanding human experience is to initially assume that our core motivations are shared across species until it is proven otherwise.

Whereas Panksepp (2005) argued for more emphasis on pain affect mechanisms in response to social exclusion, Corr (2005) argued for more emphasis on physical defense mechanisms. At the heart of Corr's critique is the suggestion that we have equated physical pain with emotional reactions to social exclusion whereas, in Corr's view, these two phenomena are actually controlled by different levels of a hierarchical defense system. It is our view that much of Corr's argument may be predicated on a mischaracterization of the nature of social exclusion. He argued, reasonably, that responses to physical pain are controlled by the FFFS, which in the Gray and McNaughton (2000) formulation controls response to aversive stimuli. Where we take issue, however, is with his argument that response to social exclusion is regulated by the behavioral inhibition system (BIS) that serves to resolve goal conflict, frequently between the FFFS and the behavioral approach system (BAS; McNaughton & Corr, 2004). Corr argued that because the BIS frequently inhibits FFFS activation as part of resolving goal conflict, physical pain (i.e., fear) and social exclusion (i.e., anxiety) frequently conflict. Indeed, if this were true, it would undermine the concept of a strong tie between pain and exclusion for which we have argued.

However, it is our view that Corr (2005) has used the term *social exclusion* to describe what might better be labeled *social behavior regulation*, and that this confusion is at the basis of the notion that pain and exclusion are mediated by different systems. Specifically, in defining social exclusion he stated, "The excluded individual wants to rejoin the group and is likely to approach the group in the knowledge that this is potentially dangerous behavior" (Corr, 2005, p. 233). Thus, Corr defined social exclusion as a mix of approach and avoidance motivation. However, we were quite clear in our article that "the dangers of rejection and exclusion provide avoidance motivation" (MacDonald & Leary, 2005, p. 205) that is separate from the approach motivation provided by other sources including the need to belong and sexual desire (see also MacDonald & Leary, 2005, p. 217). Although not explicit in the target article, this formulation conveys that a desire to rejoin and approach a group should be mediated by BAS mechanisms, whereas a desire to avoid rejection should be mediated by FFFS mechanisms. This leaves both physical pain and reaction to social exclusion controlled by FFFS mechanisms, which we maintain are activated by the experience of both social and physical pain.

Of course, Corr is correct in his assertion that actual response to social exclusion, in most cases, involves a combination of approach and avoidance motivation that, according to the Gray and McNaughton (2000) model, is regulated through BIS activity to resolve the goal conflict.[1] However, this does not mean that social exclusion cues serve to activate BIS mechanisms directly, but rather they provide for one half of the conflict by activating FFFS mechanisms. Indeed, individual-difference measures of adult attachment reveal two relatively independent attachment dimensions: one involving concern with rejection (i.e., avoidance motivation) and one involving the desirability of closeness (i.e., approach motivation; Feeney, Noller, & Hanrahan, 1994). Further, recent studies suggest that socially excluded individuals demonstrate negative reactions to exclusion even when inclusion by the rejecting individuals is not desired (i.e., no approach motivation exists so BAS and BIS activation are unlikely). In this research, people excluded by a nonsocial entity (a computer; Zadro, Williams, & Richardson, 2004) or by a despised outgroup (the Ku Klux Klan; Williams & Zadro, in press) demonstrated negative responses to this exclusion comparable with that reported by individuals excluded by ingroup members. This evidence suggests that response to social exclusion need not involve BIS activation, undermining the argument that pain and exclusion differ because they are regulated at different levels of the defensive hierarchy.

Further, just as social exclusion can lead to BIS activation due to an approach/avoid conflict, so too can physical pain. For exam-

[1] In fact, one interesting and unique feature of response to social exclusion is that the same entity (e.g., a rejecting lover) is the source of both the approach and avoidance motivations simultaneously, whereas in physical threat situations the approach (e.g., food) and avoidance (e.g., a predator) motivations often arise from different sources.

ple, one may experience considerable pain during dental procedures, but the goal of having healthy teeth will override a desire to flee from that pain. However, the existence of such approach/avoid conflicts involving physical pain does not undermine the notion that pain activates FFFS mechanisms. Instead, it highlights the role of pain in behavior that is multiply determined, just as social exclusion cues are only one source of input in the regulation of social behavior. Indeed, it is on this point we find ourselves in full agreement with Corr's position that consideration of the full defensive hierarchy is necessary for understanding human social behavior. We believe one of the contributions of our account of social pain is the suggestion that social behavior does not arise from some motivational mechanism separate from that which regulates response to physical threats. The Gray and McNaughton (2000) model provides a coherent account of how that system may operate, and examining social behavior from the perspective of this model is sure to lead to important insights. We simply believe that a focus on one part of the model (FFFS) is indeed appropriate for the examination of social exclusion, per se.

Another issue arising from Corr's (2005) commentary is the value of conceptualizing response to social exclusion in terms of pain as opposed to the more general emotional state associated with FFFS function, fear. Indeed, we agree that response to physical and social pain should share emotional features with other activators of FFFS responses such as immediate predators and high levels of carbon dioxide. However, we also believe there is "value added" in conceptualizing response to social exclusion in terms of pain beyond what can be gained by considering it as simply a fear response. First, the link between pain and social exclusion has been supported by multiple reviews of the literature (Eisenberger & Lieberman, 2004; Panksepp, 1998), including our own. Second, social pain theory provides a theoretical explanation for how social exclusion cues came to be associated with panicked reactions that is not obvious from simply considering such cues to provoke fear responses. Third, the concept of social pain provides insight into the phenomenology of response to social exclusion that is not provided from a fear perspective. Aside from the linguistic link between pain and exclusion (discounted by Corr, 2005, but favored by Panksepp, 2005), Leary and Springer (2000) suggested that hurt feelings are a unique emotion, and not a blend of other feeling states, on the basis of evidence that prediction of hurt feelings reports is possible even controlling for a comprehensive array of established emotions. On an important note, virtually all reports (99%) of hurt feelings have been shown to be associated with feeling interpersonally devalued (Leary, Springer, Negel, Ansell, & Evans, 1998). If hurt feelings truly are a unique emotion, it seems reasonable from a social pain perspective to suggest that they may represent the phenomenological experience of pain affect. This conclusion could not be drawn, however, from a strictly fear-based model of social exclusion.

This last point highlights one final issue raised by Corr that we wish to address. In his analysis, he differentiated between physical pain and response to social exclusion by highlighting the different subjective experiences that accompany the two. He then contrasted this valid observation with our statement that social and physical pain share the same sense of unpleasantness. In retrospect, we could have been more clear on our position here. Specifically, we do not wish to claim that all emotional experiences accompanying social and physical pain will be identical but rather that at the core of each experience is a feeling of pain. What other emotions accompany that pain affect will depend on the nature and meaning of either the bodily insult or social injury that triggered the sense of pain (Leary & Springer, 2000; Price, 2000), and the particular emotional blend relevant to the situation will impact on the experience of pain. Further, physical pain affect is more likely to be accompanied by pain sensations than social pain affect. Thus, although we propose that social and physical pain affect in isolation would be identical, the actual experience of the two is not likely to be the same.

In sum, both Panksepp (2005) and Corr (2005) have provided important insights and qualifications to the pain affect and defense system aspects of our arguments, respectively. However, as we have argued here, we disagree with the notion that one of these two mechanisms should be prioritized over the other. Instead, consideration that social exclusion may well lead to both feelings of pain and defensive reactions that are consistent with reaction to extreme physical threat are vital in framing understanding of human reaction to rejection.

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