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# Bodily Influences on Emotional Feelings: Accumulating Evidence and Extensions of William James' Theory of Emotion

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Bodily Influences on Emotional Feelings: Accumulating Evidence and Extensions of  
William James' Theory of Emotion

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### Abstract

William James' theory of emotion has been controversial since its inception, and a basic analysis of Cannon's (1927) critique is provided. Research on the impact of facial expressions, expressive behaviors, and visceral responses on emotional feelings are each reviewed. A good deal of evidence supports James' theory that these types of bodily feedback, along with perceptions of situational cues, are each important parts of emotional feelings. Extensions to James' theory are also reviewed, including evidence of individual differences in the effect of bodily responses on emotional experience.

Bodily Influences on Emotional Feelings: Accumulating Evidence and Extensions of  
William James' Theory of Emotion

William James made many contributions to psychology, but probably the most famous and controversial is his theory about the sequence of emotional feelings on the one hand, and behaviors and bodily changes on the other. James described his theory clearly:

“Common sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect...and the more rational statement is that we feel sorry *because* we cry, angry *because* we strike, afraid *because* we tremble...” (James, 1890, p. 449; emphasis in original).

As evidence for his assertion, James did not conduct the kinds of experiments that are customary these days. Instead he proposed some thought experiments, like trying to imagine what would remain of the experience of an emotion if we subtracted away the various bodily and behavioral perceptions that made up the feeling. James' answer was that without the bodily sensations, an emotion is nothing more than a cold rational judgment, which cannot be labeled an emotional feeling. He concluded that, “A purely disembodied human emotion is a nonentity” (James, 1890, p. 452).

James' arguments were sufficiently persuasive that most psychologists seem to have accepted his view for the next few decades. For example, J. B. Watson stated, “For twenty-six years psychologists have been content with James' barren but graceful formulation” (Watson & Morgan, 1917, p. 164). James' greatest critic, Walter Cannon

(1927) began his critical paper with a number of quotes from psychologists asserting the undeniable truth of James' theory. Cannon followed these quotes with a powerful and quickly successful critique of James' position. Cannon won the battle, although perhaps for reasons other than the quality of the arguments. By the time Cannon published his critique, he already had done much research on other topics, research that many contemporaries considered worthy of the Nobel Prize. James, on the other hand, had been dead for seventeen years. (For a more complete account of these early days of the theory, see Dror in this issue.)

In his earliest discussions of his emotion theory, James was quite clear that expressive behavior (e.g., crying) and facial expressions (e.g., furrowed brow) contributed to the feeling of various emotions (James, 1884; 1890). The third general type of bodily response that led to emotional feelings were the responses mediated by the sympathetic branch of the autonomic nervous system such as increased heart rate, respiration, and reduced digestive activity. James routinely referred to these as visceral changes. In the ensuing decades, psychologists, including James himself (James, 1894) came to focus their discussions more narrowly on the visceral changes. As a result, Cannon's critique was directed primarily at only the visceral third of James' original theory. Cannon questioned the idea that visceral changes were the sole causes of emotional feelings. As we see below, one can readily agree with most of Cannon's criticisms without any need to alter James' theory. Yet, the effect of the critique was that the field of psychology generally abandoned the theory.

Cannon (1927) proposed five reasons that James' theory was not correct, each of which seems relatively unpersuasive on careful examination.

1. *Total separation of the viscera from the central nervous system does not alter emotional behavior.*

Cannon and others had surgically severed the nerves of cats and dogs that provided information to feeling centers in the brain about the activities of the autonomic nervous system. The animals were placed in situations that would usually evoke emotional behavior, and the experimenters observed that the animals still showed normal emotional behavior, such as barking and hissing. The unchanged emotional behavior was taken as evidence that feelings did not depend on information about emotional behaviors. But of course, as even Cannon himself recognized, research on animals cannot reveal anything about emotional experience, since we have no way to know about animals' feelings. In any case, completely unchanged emotional behavior is precisely what James would have predicted. According to his theory, behaviors should occur before feelings, and so the animals should show normal emotional behaviors. Without information from their viscera, they just could not have experienced any subsequent emotional feelings.

2. *The same visceral changes occur in very different emotional states, and in non-emotional states.*

Cannon observed that since many, very different emotional feelings occur routinely, a visceral response that occurred for all of these emotional states could not be the cause of these different feelings. Since this argument focused solely on visceral responses, if feelings were also based on facial expressions and expressive behaviors, then Cannon's point would have become irrelevant. As we will review later, there is solid evidence that all three types of bodily responses influence emotional feelings, although

the viscera seem to play a key role in only some emotional feelings such as fear, anger, lust and their relations.

Cannon also assumed that the inability of 1920's science to detect visceral differences between emotions meant that there were none. In fact, since the measurement technology has improved substantially, a number of studies have demonstrated different patterns of autonomic response that match different emotional states (for a review, see Kreibig, 2010). This will also be discussed in greater detail later in the paper.

3. *The viscera are too insensitive to provide adequate feedback. And*
4. *The viscera are too slow in responding to account for the often very rapid onset of an emotional experience.*

We have lumped these two because they both seem to be strong arguments against the possibility that visceral responses alone produce emotional experience. But of course, James' full theory would include facial expressions and expressive behaviors which are rapid and can help provide distinctive, differentiated feedback.

5. *Artificial induction of the visceral changes characteristic of emotions does not produce them.*

This seems to be the crucial empirical test, since James' entire theory consists of little more than the hypothesis that inducing bodily and behavioral changes should produce the corresponding feelings. However, Cannon again focused specifically on the visceral responses, and these alone without any facial expressions or expressive behaviors do not necessarily serve as a cue for emotional feeling. As we will review later, misattribution research has demonstrated that while arousal is one of the cues for some emotional feelings, it can also be attributed to other non-emotional sources. James' theory

would suggest that if people experienced visceral feedback along with facial expressions and emotional actions, they should report increases in the corresponding feelings. Like Cannon, many research traditions examining James' theory have focused on only one of these three kinds of bodily emotional responses in any study or research program, but all three show similarly consistent, powerful results (for an extensive review, see Laird, 2007).

We will briefly review the results of each kind of bodily manipulation on feelings. Along the way, we will also describe extensions and complications to the simplest form of James' theory. One of these is the adoption of the label "self-perception" for the process by which behaviors and bodily responses explain emotional feelings (Bem, 1967). We intend the "perception" part of this label to be taken seriously. Actions and bodily changes produce cues that may be integrated to produce the feeling. Through this review, we aim to demonstrate that emotional feelings are perceptions of our actions and the context in which they occur.

### **Facial Expressions and Feelings**

James' theory would predict that if people are induced to adopt facial expressions, they should report feeling the corresponding emotion. Inducing facial expressions may seem simple, but any effects of "just asking" people to make an expression might easily be explained as compliance with the not-very-subtle experimental demand. Therefore, various ways of disguising the intent of expression manipulations have been employed. In one early study, participants were told that the purpose of the research was to measure the electromyographic changes of facial muscles that accompanied perceptual tasks (Laird, 1974). Electrodes were attached to participants' faces, and on each trial they were

asked to contract or relax the muscles under different electrodes, leading them to form different facial expressions. Participants were interviewed about their understanding of the experiment, and we removed any who had identified the general idea, that expressions might affect feelings. The remaining participants had no idea why, but tended to report feelings consistent with their expressions.

Other clever deceptions have been used to manipulate facial expressions. Whether pretending to study vowel pronunciations or supposedly investigating the best way for paralyzed people to learn to write with their mouths (using the pen to force different expressions), the research has found that positive facial expressions lead to greater feeling of positive emotions, and negative facial expressions to feelings of negative emotions (e.g., Strack, Martin, & Stepper, 1988; Zanjonc, Murphy, & Inglehart, 1989).

The amount of research conducted on facial expressions and feelings is quite large, and the accumulation of this work has made a strong case for the James' theory of emotion (for a more complete review, see Laird, 2007). Facial expressions have been shown to produce emotional feelings of fear, sadness, anger, and happiness (e.g., Duclos, et al., 1989; Flack, Laird, & Cavallaro, 1999; Strack, et al., 1988). Research on preventing expressions, has been shown to also reduce the positive and negatively valenced emotional feelings in the laboratory (e.g., Davis, Senghas, & Ochsner, 2009; Laird et al., 1994) and in the field (e.g., Duclos & Laird, 2001; Van Swearingen, Cohn, Bajaj-Luthra, 1999). More recent research has found that BOTOX patients showed emotional muting to mild positive video clips, while no muting was found in response to strong positive clips or to negative clips (Davis, Senghas, Brandt, & Ochsner, 2010). A

different design found that clinical participants who received forehead BOTOX injections reported lower anxiety and depression (Lewis & Bowler, 2009). In sum, numerous studies have shown just the effects James predicted: creating facial expressions increases emotional feelings, and preventing expressions reduces feelings. While the findings are not always consistent, particularly for emotions such as surprise and disgust (Reisenzein, Studtmann, & Horstmann, 2013), these emotional feelings may simply rely more heavily upon cues from visceral feedback or expressive behaviors.

### **Expressive Behaviors and Feelings**

There are other bodily actions that also influence the emotional experience. Research has supported James' notion that not only are these behaviors associated with emotions, but that these bodily movements have the ability to help generate emotional feelings.

For example, romantic attraction is an emotion which is largely expressed in bodily ways, the most distinctive of which is shared, mutual gaze. James would have predicted that gazing came before, and served as a cause of romantic feelings. To test this, pairs of men and women strangers were asked to gaze at each other's hands, or into each other's eyes. Those who gazed into another's eyes chose descriptions of their partner that indicated greater respect, liking, and attraction (Kellerman, Lewis, & Laird, 1989). Additionally, touch increases autonomic responses related to attraction, and participants who held hands reported more positive mood, less negative mood, and were more willing to return again to meet their partner (Williams & Kleinke, 1993).

Posture is also an important aspect of emotional expression, and as James would predict, posture also alters emotional feelings. A slumped posture led people to feel more

sadness, an erect posture with clenched fists increased feelings of anger and disgust, leaning back with hands blocking the face increased feelings of fear and surprise, and sitting upright without a slouch led to feelings of pride (Duclos et al., 1989; Riskind, 1983; Riskind & Gotay, 1982; Stepper & Strack, 1993). Perhaps most importantly, postures and facial expressions have an additive effect, with greater increases in emotional feelings reported when participants perform both (Flack et al., 1999).

Feedback from breathing also wields an influence, and through adopting particular respiratory patterns, emotional feelings can be induced (Bloch, Lemeignan, & Aguilera, 1991; Philippot, Chappelle, & Blairy, 2002). Similarly, when individuals manipulate the pace, rhythm, or pitch of their own voices, corresponding emotional feelings are reported (Hatfield, Hsee, Costello, Weisman, & Denney, 1995; Siegman & Boyle, 1993). Contrary to the catharsis hypothesis but consistent with James' theory, acting out anger through verbal or physical responses actually tends to increase aggression and angry feelings (for a review, see Bushman, Baumeister, & Stock, 1999). To successfully relieve one's anger, it is better to take James' advice: "Count ten before venting your anger, and its occasion seems ridiculous" (James, 1890, p. 463). In conclusion, all sorts of expressive behaviors have been shown to have a powerful influence on feelings, and give further indication that bodily responses indeed precede the emotional experience.

### **Visceral Responses and Feelings**

Testing the Jamesian role of visceral feedback in emotional feelings can be designed in the same way as for other bodily responses: first manipulate the autonomic arousal responses, and then inquire about emotional feelings. However, the practical

complications are greater, because manipulating arousal levels is difficult. It has been attempted a variety of ways, and researchers have found fairly consistent support for the influence of the viscera and autonomic responses on emotional feeling.

### **Early Work**

Cannon based his critique in part on some of the early work designed to test James' theory of emotion. Several studies manipulated arousal by injecting participants with adrenaline, producing the same bodily responses as emotional arousal such as heart pounding and increased respiration. In general, a majority of participants did not report emotional feeling, while a fair amount reported feelings which were "like an emotion" or like those prior to an emotional episode, and a smaller group reported a genuine emotional feeling (Cantril & Hunt, 1932; Landis & Hunt, 1932; Marañón, 1924). These initial tests of James' theory were inconclusive. Only a minority of participants reported feeling emotions, yet the feelings "like an emotion" would perhaps be interpreted as a real emotion in other circumstances. As Cantril and Hunt (1932) pointed out, "The lack of any object or reason for the emotion usually deprives it of its genuineness" (p. 302). Additionally, any effect at all is a bit surprising if something like James' theory was not correct. These conflicting results certainly left some room for Cannon to assume visceral arousal did not cause emotional feelings, but at the expense of overlooking the situational cues as well as the portion of participants who did feel emotions.

### **Misattribution of Emotion**

Stanley Schachter and his colleagues proposed that knowing there was no reason to feel an emotion would be sufficient to undermine any potential feelings, as would knowing what the effects of adrenalin would be (Schachter & Singer, 1962). To test these

ideas, they conducted studies in which arousal levels were varied by the injection of adrenalin or a neutral saline solution, and the participants were either informed or misinformed about the effects of their injection. After the injection, participants were placed in situations which would naturally evoke anger or euphoria. In general, the quality of the emotional experience was determined by the situation, and increased arousal, if unexplained, was associated with stronger feelings of anger, but not happiness. Most interestingly, those who received adrenalin and were informed correctly of its effects reported the least emotional and behavioral effects, apparently because they interpreted their symptoms as due to a non-emotional cause. In effect, they “explained away” the bodily arousal as non-emotional, and did not feel anything.

Following from this research, a large literature on misattribution effects has developed. People have been induced to attribute naturally occurring arousal to pills, injections, irritating noises, and other neutral causes (e.g., Ross, Rodin, & Zimbardo, 1969; Schacter & Wheeler 1962; Storms & Nisbett, 1970). Additionally, physiological arousal can also increase emotional feelings when it is attributed to stemming from an emotional situation. After exercising, people experience stronger feelings of aggression and sexual attraction than those who have not exercised (White & Kight, 1984; Zillmann, Johnson, & Day, 1974), and are more emotionally affected by positive or negative feedback (Turnbull & Wolfson, 2002). Additionally, men walking over an anxiety-evoking bridge are likely to misattribute the arousal as attraction towards a female stranger (Dutton & Aron, 1974). Although some were not able to replicate these bridge findings (Kenrick, Cialdini, & Under, 1979), others have shown that arousal from

exercise, amusement, or anxiety can be misattributed to romantic attraction (White, Fishbein, & Rutsein, 1981).

In sum, the evidence that visceral arousal is an important indicator of emotional feeling is substantial. However, arousal does not affect all emotions. Fear, anger and romantic attraction are affected by increasing arousal, and other emotions, such as happiness, are unaffected. This qualification matches other research on the dimensions of emotional experience. In the classic circumplex model (Russell & Bullock, 1985) anger, fear and romantic love are high arousal emotions, sadness is low arousal, and happiness is neither. Therefore, we would not expect that emotions that lack an arousal component would be affected by arousal changes. However, much evidence suggests that high arousal emotions are produced by arousal increases. Additionally, this research highlights the role of context in human perception of bodily responses. Arousal may lead to increases in attraction, anxiety, anger, or to nothing at all, depending on how the person understands the situational cues.

### **Specific Patterns of Arousal**

Part of James' theory included the claim that each emotion had its own specific set of bodily and visceral responses (James, 1884; James, 1890). As mentioned previously, Cannon (1927) argued that visceral responses do not differentiate between emotions, and Schachter and Singer (1962) made a similar claim. However, more recent research has studied patterns of physiological responses on many bodily measures simultaneously, and support has accumulated for James' claim of emotion-specific bodily activity (for a review, see Kreibig, 2010).

Levenson, Ekman, and colleagues have demonstrated that altering facial expressions induced emotion specific autonomic nervous system activity among both males and females, older and younger adults, among professional actors, and across cultures (Levenson, Carstensen, Friesen & Ekman, 1991; Levenson, Ekman, & Friesen, 1990; Levenson, Ekman, Heider & Friesen, 1992). Other researchers have combined cardiovascular, respiratory, electrodermal, facial temperature, and facial movement data (in different combinations for each study) and found distinct patterns allowing differentiation between specific emotional feelings such as happiness, amusement, contentment, sadness, fear, and agitation (e.g., Christie & Friedman, 2004; Kolodyazhniy, Kreibig, Gross, Roth, & Wilhelm, 2011; Nykliček, Thayer, & van Doornen, 1997). Additionally, researchers have demonstrated specific patterns of brain region activity among participants who recalled emotional memories (Damasio et al., 2000), and others have linked neural patterns of specific emotions with changes in heart rate feedback (Critchley et al., 2005).

This may seem to contradict the misattribution research. If each emotion has its own pattern of bodily visceral responses, how do people inaccurately attribute their exercise arousal as due to either aggression or to romantic attraction? One answer may be that while emotions each have a specific pattern of bodily responses, some patterns include similar bodily cues. When certain situational cues are highlighted, as in the misattribution experiments, then the similarities in the patterns of bodily behavior may allow for differing interpretations. Therefore, the misattribution research is not necessarily inconsistent with James, and instead shows that perceptions of one's own behavior do not occur in a vacuum, but in a situational context.

**Necessity of Autonomic Feedback**

James (1890)

suggested that one way to test his theory was examining the emotional feelings of men with no bodily sensation, and some researchers have attempted similar tests. Pure autonomic failure (PAF) is a disorder which leads to degeneration of sympathetic and parasympathetic feedback systems, and while patients with PAF do still report having emotional experiences, they are somewhat muted compared to a non-patient sample (Critchley, Mathias, Dolan, 2001). They tend to show less fear-conditioning related neural activity (Critchley, Mathias, & Dolan, 2002), and they are less accurate predicting the emotional feeling of another based upon the situation; however, these patients can still accurately recognize emotional expressions on others' faces (Heims, Critchley, Dolan, Mathias, & Cipolotti, 2004). Similarly, research on people with spinal cord injuries (SCI) has sometimes found muted feelings of fear, anger, sexual excitement, and positive affect (e.g., Hohmann, 1966; Salter; Smith; & Ethans, 2012), but other research has not found the same reductions in emotional feelings (e.g., Bermond, Nieuwenhuysedr, Fasotti, & Schuerman, 1991; Cobos, Sánchez, García, Nieves Vera, & Vila, 2002).

Another test is examining beta-blocker medications, which interfere with adrenaline and arousal. They have been successfully used to reduce the physical and emotional symptoms stemming from moderate performance anxiety, social anxiety, and flight phobia (Ekeberg, Kjeldsen, Greenwood, & Enger, 1990; Laverdure & Boulenger, 1991; Lehrer, 1987; Noyes, 1985) and to reduce aggression symptoms in people with a variety of psychological disorders (for a review, see Haspel, 1995). Beta-blockers can

also intensify emotional-states which are associated with low-arousal such as sadness and depression, and have even been implicated in increasing risk of suicide (Rosen & Kostis, 1985; Sørensen, Mellekjaer, & Olsen, 2001). However, research on healthy patients has often not found the same influence of beta-blockers on emotional feelings (e.g., Cleghorn, Peterfy, Pinter, & Pattee, 1970; Erdmann & van Lindern, 1980).

While these findings are mixed, it is important to note that people with PAF and SCI or those taking beta-blockers still receive some feedback from facial expressions and some expressive behaviors. Therefore, while no strict conclusion can be made, many of the effects are consistent with James' predictions: reducing visceral cues often lessens high-arousal emotional experiences, and increases other low-arousal emotional feelings.

### **Individual Differences**

When James proposed his theory of emotion, his arguments were casual and bold, as if he expected them to be rather easily supported. Part of his confidence may have stemmed from his own experience, from analyzing his own emotional feelings. We can imagine him sitting quietly, trying on facial expressions or postures, and discovering his theory. In contrast, Cannon seemed equally confident that his arguments would be compelling, even though in a number of places he acknowledges the kinds of effects James had first proposed. Why did Cannon and James arrive at precisely opposite conclusions from information that was almost identical? We suspect that the answer is that the two men represented the two varieties of feeling mechanisms that have been observed in the years since Cannon's critique.

We have presented all the results above as essentially main effects of bodily and visceral responses on feelings. In doing so, we have overlooked a major feature of the

literature on self-perception of emotion. When participants in research perform expressive behaviors, many people report feeling the corresponding emotion, but many do not. Instead, these people appear to interpret their emotions through the lens of the situational context in which they find themselves. This insight was first noted in the early research by Laird and colleagues: most of the effect found in expression manipulation studies were contributed by one portion of the participants while other participants were basically unaffected (Laird & Crosby, 1974). Emotional responses to facial expressions were later found to remain consistent in an individual over time and across emotions (Bresler & Laird, 1983; Duncan & Laird, 1977). Later investigations demonstrated that this individual difference may be tied to other self-perception processes as well. The same people whose emotional feelings were not impacted by facial expressions were also less likely to experience cognitive dissonance after performing a counter-attitudinal behavior (Laird & Berglas, 1975), less likely to experience mood-congruent memories (Schnall & Laird, 2003), report fewer symptoms of pre-menstrual syndrome (Schnall, Abrahamson, & Laird, 2002), and are more likely to overeat and become overweight or obese (McArthur, Solomon, & Jaffee, 1980). Similarly, only those who were accurate at perceiving their heart rate showed a positive correlation between heart rate and feelings of anxiety (Schandry, 2007). Cumulatively, this work has found that while some people are indeed highly responsive to *personal cues* (e.g., facial expressions, actions, physical appearance), others are generally more responsive to *situational cues* (e.g., norms about situations, time of day, social pressures) (Laird & Berglas, 1975).

Note that the people whose feelings were more affected by situational cues were not behaving as “common sense” would imply: they were not generating feelings directly

from perception of the exciting circumstance, with the feelings then “causing” the emotional behaviors. Instead they perceived their circumstances, including social expectations, which led to feelings. This is also self-perception, just from a different set of cues, from the social context rather than behavior.

### **Summary and Conclusions**

In sum, James’ basic notion, that emotional feelings are consequences of expressions and autonomic responses has been supported over and over, and now been extended to other feelings such as liking, confidence, and what is perceived to be real, and other behaviors such as making speeches, writing essays, and making a choice (for review, see Laird, 2007). Cannon’s most pointed criticism was that inducing actions related to emotions (and specifically visceral responses) did not produce emotional feelings. As we have seen, he was simply wrong. In literally hundreds of experiments, when facial expressions, expressive behaviors or visceral responses are induced, the corresponding feelings occur. In each of the types of behavior manipulation, a variety of feelings have been induced or strengthened. For example, manipulating facial expressions or postures has created feelings of happiness, amusement, pride, anger, fear, sadness, and romantic attraction. Preventing expressions has reduced many of these same feelings. Visceral arousal is more complicated, but once again it is clear that increases in arousal lead to some emotional feelings, including anger, fear and romantic attraction. Similarly, reducing visceral responses often leads to muted emotions.

Are these effects large enough to support the conclusion that feelings arise from self-perceptions of bodily actions? We believe so. In many of the studies reported, effect sizes are comparable to other common bodies of psychological research. Furthermore,

most of the research focuses on only one of the varieties of emotional behaviors, whereas in real life, a multitude of behaviors are occurring at once. When more kinds of bodily cues are added to the designs, more powerful effects are observed. Furthermore, some of the variables that are related to self-perception such as susceptibility to PMS and obesity are large enough to constitute real life problems. The research are scattered enough so that some caution about these effects is certainly reasonable, but the observed effects are robust enough to warrant some confidence, as well as further pursuit of these questions. Overall, the reasonable conclusion, we believe, is that James was in fact correct: feelings are the consequences, not the causes, of emotional behavior and bodily response. Individuals may differ in which sources of information they rely upon most heavily: personal cues from their own bodily states and behaviors, or situational cues from their understanding of the social context.

Two further questions emerge from these conclusions:

- 1) *If feelings are not causes, what are they? And*
- 2) *If feelings don't cause emotional behaviors, what does?*

Once the question about the nature of feelings is asked, it is clear enough that feelings are about the emotional behaviors. Feelings provide people with information about themselves: what they are doing now, and may be doing in a few moments. James himself recognized that our feelings were like other results of information gathering, obtained automatically and non-consciously (James, 1884). In short, feelings are perceptions of the patterns of emotional behaviors imbedded in a situational context. This is the source of the more recent description of this perspective as “self-perception theory” (Bem, 1967).

The theoretical problem for many emotion theories is how perceptions might work. Common sense ideas about what feelings are tend to be something almost necessarily vague, such as brain states or activities. In contrast, the Jamesian answer is that feelings are perceptions of and information about our own bodies and behaviors in a particular situation.

To address question 2), emotional behaviors and bodily changes are not caused by feelings, but are all parts of an evolved, automatic system that leads us to meet some of life's challenges. The feelings represent information about which of these patterns is active, so that we can then more actively choose to inhibit or exaggerate the responses. Basically, they are information that is useful because it makes self-control possible, allowing us to quickly understand our situation and make decisions educated with this emotional-knowledge.

In the famous quote that began this paper, James (1890) refers to behaviors as causing feelings, rather than feelings causing behaviors. While James was correct about the sequence, the word "because" was unfortunate shorthand. Instead, the behaviors and bodily states provide cues from which the feeling is constructed. When someone feels angry, the experience is constructed from feedback from facial expressions like a frown, postures like leaning forward with contracted muscles, and actions like punching someone. The process by which an emotional feeling arises from bodily and behavioral cues is very much like the process by which a perception of distance in the physical world arises from cues of linear perspective, superposition, and motion parallax.

Self perception theory is an expansion of James idea about the sequence of behavior and emotional feelings. One of the self-perception additions (and the home of

the label, “self-perception”) is to apply the same ideas to attitudes and behaviors. Common sense holds, apparently erroneously, that attitudes precede and cause our behaviors. We have already suggested that James may have come to his emotion theory by personal observations. Given his regular use of self-observation, it is not surprising to find that James also discovered in his own experience the germs of the self-perception model of attitudes. Acting as if you believe something will make you believe it, or so James discovered about himself.

“The best thing I can say for it [his theory] is that in writing it, I have almost persuaded myself it may be true.” (James, 1884, p. 205)

## References

- Bem, D. J. (1967). Self-perception: An alternative interpretation of cognitive dissonance. *Psychological Review*, 74, 183-200.
- Bermond, B., Nieuwenhuysedr, B., Fasotti, L., & Schuerman, J. (1991). Spinal cord lesions, peripheral feedback, and intensities of emotional feelings. *Cognition & Emotion*, 5, 201-220.
- Bloch, S., Lemeignan, M., & Aguilera, N. (1991). Specific respiratory patterns distinguish among human basic emotions. *International Journal of Psychophysiology*, 11, 141-154.
- Bresler, C., & Laird, J. D. (1983, April). Short-term stability and discriminant validity of the "self-situational" cue dimension. Paper presented at the annual meeting of the Eastern Psychological Association: Philadelphia, PA.
- Bushman, B. J., Baumeister, R. F., & Stack, A. D. (1999). Catharsis, aggression, and persuasive influence: Self-fulfilling or self-defeating prophecies? *Journal of Personality and Social Psychology*, 76, 367-376.
- Cannon, W. B. (1927). The James-Lange theory of emotions: A critical examination and an alternative theory. *The American Journal of Psychology*, 39, 106-124.
- Cantril, H., & Hunt, W. A. (1932). Emotional effects produced by the injection of adrenalin. *The American Journal of Psychology*, 44, 300-307.
- Christie, I. C., & Friedman, B. H. (2004). Autonomic specificity of discrete emotion and dimensions of affective space: A multivariate approach. *International Journal of Psychophysiology*, 51, 143-153.

- Cleghorn, J. M., Peterfy, G., Pinter, E. J., & Pattee, C. J. (1970). Verbal anxiety and the beta adrenergic receptors: A facilitating mechanism? *Journal of Nervous and Mental Disease*, *151*, 266-272.
- Cobos, P., Sánchez, M., García, C., Nieves Vera, M., & Vila, J. (2002). Revisiting the James versus Cannon debate on emotion: startle and autonomic modulation in patients with spinal cord injuries. *Biological Psychology*, *61*, 251-269.
- Critchley, H. D., Mathias, C. J., & Dolan, R. J. (2001). Neuroanatomical basis for first- and second-order representations of bodily states. *Nature Neuroscience*, *4*, 207-212.
- Critchley, H. D., Mathias, C. J., & Dolan, R. J. (2002). Fear conditioning in humans: The influence of awareness and autonomic arousal on functional neuroanatomy. *Neuron*, *33*, 653-663.
- Critchley, H. D., Rotshtein, P., Nagai, Y., O'Doherty, J., Mathias, C. J., & Dolan, R. J. (2005). Activity in the human brain predicting differential heart rate responses to emotional facial expressions. *Neuroimage*, *24*, 751-762.
- Damasio, A. R., Grabowski, T. J., Bechara, A., Damasio, H., Ponto, L. L., Parvizi, J., & Hichwa, R. D. (2000). Subcortical and cortical brain activity during the feeling of self-generated emotions. *Nature Neuroscience*, *3*, 1049-1056.
- Davis, J. I., Senghas, A., Brandt, F., & Ochsner, K. N. (2010). The effects of BOTOX injections on emotional experience. *Emotion*, *10*, 433-440.
- Davis, J. I., Senghas, A., & Ochsner, K. N. (2009). How does facial feedback modulate emotional experience? *Journal of Research in Personality*, *43*, 822-829.
- Duclos, S. E., & Laird, J. D. (2001). The deliberate control of emotional experience through control of expressions. *Cognition & Emotion*, *15*, 27-56.

- Duclos, S. E., Laird, J. D., Schneider, E., Sexter, M., Stern, L., & Van Lichten, O. (1989). Emotion-specific effects of facial expressions and postures on emotional experience. *Journal of Personality and Social Psychology, 57*, 100-108.
- Duncan, J., & Laird, J. D. (1977). Cross-modality consistencies in individual differences in self-attribution. *Journal of Personality, 45*, 191-206.
- Dutton, D. G., & Aron, A. P. (1974). Some evidence for heightened sexual attraction under conditions of high anxiety. *Journal of Personality and Social Psychology, 30*, 510-517.
- Ekeberg, Ø., Kjeldsen, S. E., Greenwood, D. T., & Enger, E. (1990). Effects of selective beta-adrenoceptor blockade on anxiety associated with flight phobia. *Journal of Psychopharmacology, 4*, 35-41.
- Erdmann, G., & van Lindern, B. (1980). The effects of beta-adrenergic stimulation and beta-adrenergic blockade on emotional reactions. *Psychophysiology, 17*, 332-338.
- Flack, W. F., Jr., Laird, J. D., & Cavallaro, L. A. (1999). Separate and combined effects of facial expressions and bodily postures on emotional feelings. *European Journal of Social Psychology, 29*, 203-217.
- Haspel, T. (1995). Beta-blockers and the treatment of aggression. *Harvard Review of Psychiatry, 2*, 274-281.
- Hatfield, E., Hsee, C. K., Costello, J., Weisman, M. S., & Denney, C. (1995). The impact of vocal feedback on emotional experience and expression. *Journal of Social Behavior and Personality, 10*, 293-313.
- Heims, H. C., Critchley, H. D., Dolan, R., Mathias, C. J., & Cipolotti, L. (2004). Social and motivational functioning is not critically dependent on feedback of autonomic

responses: Neuropsychological evidence from patients with pure autonomic failure. *Neuropsychologia*, 42, 1979-1988.

Hohmann, G. (1966). Some effects of spinal cord lesion on experienced emotional feelings. *Psychophysiology*, 3, 526-534.

James, W. (1884). What is an emotion? *Mind*, 9, 188-205.

James, W. (1890). *The principles of psychology*. New York: Dover Publications, Inc.

James, W. (1894). Discussion: The physical basis of emotion. *Psychological Review*, 1, 516-529.

Kellerman, J., Lewis, J., & Laird, J. D. (1989). Looking and loving: The effects of mutual gaze on feelings of romantic love. *Journal of Research in Personality*, 23, 145-161.

Kenrick, D. T., Cialdini, R., & Linder, D. (1979). Misattribution under fear-producing circumstances: Four failures to replicate. *Personality and Social Psychology Bulletin*, 5, 329-334.

Kolodyazhniy, V., Kreibig, S. D., Gross, J. J., Roth, W. T., & Wilhelm, F. H. (2011). An affective computing approach to physiological emotion specificity: Toward subject-independent and stimulus-independent classification of film-induced emotions. *Psychophysiology*, 48, 908-922.

Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. *Biological Psychology*, 84, 394-421.

Laird, J. D. (1974). Self-attribution of emotion: the effects of expressive behavior on the quality of emotional experience. *Journal of Personality and Social Psychology*, 29, 475-486.

Laird, J. D. (2007). *Feelings: The perception of self*. Oxford University Press, USA.

- Laird, J. D., & Berglas, S. (1975). Individual differences in the effects of engaging in counter-attitudinal behavior. *Journal of Personality, 43*, 286-304.
- Laird, J., & Crosby, M. (1974). Individual differences in the self-attribution of emotion. In H. London & R. E. Nisbett (Eds.), *Thought and feeling: Cognitive alteration of feeling states*, (pp. 44-59). Chicago, IL: Transaction Publishers.
- Laird, J. D., Alibozak, T., Davainis, D., Deignan, K., Fontanella, K., Hong, J., ... & Pacheco, C. (1994). Individual differences in the effects of spontaneous mimicry on emotional contagion. *Motivation and Emotion, 18*, 231-247.
- Landis, C., & Hunt, W. A. (1932). Adrenalin and emotion. *Psychological Review, 39*, 467-485.
- Laverdure, B., & Boulenger, J. P. (1991). Beta-blocking drugs and anxiety. A proven therapeutic value. *L'Encephale, 17*, 481-492.
- Lehrer, P. M. (1987). A review of the approaches to the management of tension and stage fright in music performance. *Journal of Research in Music Education, 35*, 143-153.
- Levenson, R. W., Carstensen, L. L., Friesen, W. V., & Ekman, P. (1991). Emotion, physiology, and expression in old age. *Psychology and Aging, 6*, 28-35.
- Levenson, R. W., Ekman, P., & Friesen, W. V. (1990). Voluntary facial action generates emotion-specific autonomic nervous system activity. *Psychophysiology, 27*, 363-384.
- Levenson, R. W., Ekman, P., Heider, K., & Friesen, W. V. (1992). Emotion and autonomic nervous system activity in the Minangkabau of West Sumatra. *Journal of Personality and Social Psychology, 62*, 972-988.

- Lewis, M. B., & Bowler, P. J. (2009). Botulinum toxin cosmetic therapy correlates with a more positive mood. *Journal of Cosmetic Dermatology*, *8*, 24-26.
- Marañon, G. (1924). A contribution to the study of the action of adrenalin on the emotions. *Revue Francaise D'Endocrinologie*, *2*, 301-325.
- McArthur, L. Z., Solomon, M. R., & Jaffe, R. H. (1980). Weight differences in emotional responsiveness to proprioceptive and pictorial stimuli. *Journal of Personality and Social Psychology*, *39*, 308-319.
- Noyes, R. Jr. (1985). Beta-adrenergic blocking drugs in anxiety and stress. *The Psychiatric Clinics of North America*, *8*, 119-132.
- Nyklíček, I., Thayer, J. F., & van Doornen, L. J. (1997). Cardiorespiratory differentiation of musically-induced emotions. *Journal of Psychophysiology*, *11*, 304-321.
- Philippot, P., Chapelle, G., & Blairy, S. (2002). Respiratory feedback in the generation of emotion. *Cognition & Emotion*, *16*, 605-627.
- Reisenzein, R., Studtmann, M., & Horstmann, G. (2013). Coherence between emotion and facial expression: Evidence from laboratory experiments. *Emotion Review*, *5*, 16-23.
- Riskind, J. H. (1983). Nonverbal expressions and the accessibility of life experience memories: A congruence hypothesis. *Social Cognition*, *2*, 62-86.
- Riskind, J. H., & Gotay, C. C. (1982). Physical posture: Could it have regulatory or feedback effects on motivation and emotion? *Motivation and Emotion*, *6*, 273-298.
- Rosen, R. C., & Kostis, J. B. (1985). Biobehavioral sequelae associated with adrenergic-inhibiting antihypertensive agents: A critical review. *Health Psychology*, *4*, 579-604.

- Ross, L., Rodin, J., & Zimbardo, P. G. (1969). Toward an attribution therapy: The reduction of fear through induced cognitive-emotional misattribution. *Journal of Personality and Social Psychology, 12*, 279-288.
- Russell, J. A., & Bullock, M. (1985). Multidimensional scaling of emotional facial expressions: Similarity from preschoolers to adults. *Journal of Personality and Social Psychology, 48*, 1290-1298.
- Salter, J. E., Smith, S. D., & Ethans, K. D. (2012). Positive and negative affect in individuals with spinal cord injuries. *Spinal Cord, 51*, 252-256.
- Schachter, S., & Singer, J. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review, 69*, 379-399.
- Schachter, S., & Wheeler, L. (1962). Epinephrine, chlorpromazine, and amusement. *The Journal of Abnormal and Social Psychology, 65*, 121-128.
- Schandry, R. (2007). Heart beat perception and emotional experience. *Psychophysiology, 18*, 483-488.
- Schnall, S., Abrahamson, A., & Laird, J. D. (2002). Premenstrual syndrome and misattribution: A self-perception, individual differences perspective. *Basic and Applied Social Psychology, 24*, 215-228.
- Schnall, S., & Laird, J. (2003). Keep smiling: Enduring effects of facial expressions and postures on emotional experience and memory. *Cognition & Emotion, 17*, 787-797.
- Siegmán, A. W., & Boyle, S. (1993). Voices of fear and anxiety and sadness and depression: The effects of speech rate and loudness on fear and anxiety and sadness and depression. *Journal of Abnormal Psychology, 102*, 430-437.

- Sørensen, H. T., Mellemkjaer, L., & Olsen, J. H. (2001). Risk of suicide in users of  $\beta$ -adrenoceptor blockers, calcium channel blockers and angiotensin converting enzyme inhibitors. *British Journal of Clinical Pharmacology*, *52*, 313-318.
- Strack, F., Martin, L. L., & Stepper, S. (1988). Inhibiting and facilitating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology*, *54*, 768-777.
- Storms, M. D., & Nisbett, R. E. (1970). Insomnia and the attribution process. *Journal of Personality and Social Psychology*, *16*, 319-328.
- Stepper, S., & Strack, F. (1993). Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology*, *64*, 211-220.
- Strack, F., Martin, L. L., & Stepper, S. (1988). Inhibiting and facilitating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology*, *54*, 768-777.
- Turnbull, M., & Wolfson, S. (2002). Effects of exercise and outcome feedback on mood: Evidence of misattribution. *Journal of Sport Behaviour*, *25*, 394-406.
- Van Swearingen, J. M., Cohn, J. F., & Bajaj-Luthra, A. (1999). Specific impairment of smiling increases the severity of depressive symptoms in patients with facial neuromuscular disorders. *Aesthetic Plastic Surgery*, *23*, 416-423.
- Watson, J. B., & Morgan, J. J. B. (1917). Emotional reactions and psychological experimentation. *The American Journal of Psychology*, *28*, 163-174.
- White, G. L., Fishbein, S., & Rutsein, J. (1981). Passionate love and the misattribution of arousal. *Journal of Personality and Social Psychology*, *41*, 56-62.
- White, G. L., & Kight, T. D. (1984). Misattribution of arousal and attraction: Effects of

- salience of explanations for arousal. *Journal of Experimental Social Psychology*, 20, 55-64.
- Williams, G. P., & Kleinke, C. L. (1993). Effects of mutual gaze and touch on attraction, mood, and cardiovascular reactivity. *Journal of Research in Personality*, 27, 170-183.
- Zajonc, R. B., Murphy, S. T., & Inglehart, M. (1989). Feeling and facial efference: Implications of the vascular theory of emotion. *Psychological Review*, 96, 395-416.
- Zillmann, D., Johnson, R. C., & Day, K. D. (1974). Attribution of apparent arousal and proficiency of recovery from sympathetic activation affecting excitation transfer to aggressive behavior. *Journal of Experimental Social Psychology*, 10, 503-515.