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ADMIRATION FOR VIRTUE:
NEUROSCIENTIFIC PERSPECTIVES ON A MOTIVATING EMOTION

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ABSTRACT

Social emotions like admiration for another person's virtue often lead to a sense of heightened self-awareness that is profoundly motivating (i.e. the desire to be virtuous and to accomplish meaningful actions despite difficult obstacles; (Jonathan Haidt & Seder, 2007). Our recent study of the brain and psychophysiological correlates of experiencing admiration revealed that the feeling of this complex, culturally constructed, motivating emotion involves not only high-level "cognitive" systems, but also the neural systems for the feeling and regulation of the body systems that maintain life, especially those related to the gut and viscera (Immordino-Yang, McColl, Damasio, & Damasio, 2009, in press). These findings contribute an interesting jumping-off point for reexamining the educational study of motivation states, in that they suggest that, contrary to current conceptions in educational research, nonconscious, low-level biological drives related to survival may be critical contributors to motivation.

Social emotions like admiration for another person's virtue play a critical role in interpersonal relationships and moral behavior, and often lead to a sense of heightened self-awareness that is profoundly motivating [i.e. the desire to be virtuous and to accomplish meaningful actions despite difficult obstacles; (Jonathan Haidt & Seder, 2007)]. Our recent study of the brain and psychophysiological correlates of experiencing admiration revealed that the feeling of this complex, culturally constructed, motivating emotion involves not only high-level "cognitive" systems, but also the neural systems for the feeling of one's own body, especially the gut and viscera (Immordino-Yang, McColl, Damasio, & Damasio, 2009, in press). The experience of this emotion was also associated with increased blood flow to brain systems that operate at a very low level to regulate consciousness and basic biological survival, such as blood pressure and hormone regulation. These findings contribute an interesting jumping-off point for reexamining the educational study of motivation states, in that they suggest that, contrary to current conceptions in educational research, nonconscious, low-level biological drives related to survival may be critical contributors to motivation. In contrast, most current educational research on motivation examines only high-level processing of cognitive conceptions as contributors to motivation, e.g. self-report of perceived self-competence. In the end, it may be that considering processing associated with nonconscious drives in relation to processing of conscious, cognitive self-knowledge would afford educational researchers a new vantage point from which to investigate and understand the nature of motivation.

Admiration for Virtue: A motivating social emotion

Emotions such as admiration for virtue are intrinsically motivating---they incite people to act in ways that are meaningful for themselves and beneficial for society (Jonathan Haidt, 2003).

While the study of positive, social, elevating emotions of the sort that lead to some kinds of motivation has been largely neglected relative to the study of basic (mainly negative) emotions such as fear and disgust, there is a building movement investigating the functioning of positive, elevating emotions such as admiration and gratitude, both from a psychological and a neuropsychological perspective (Algoe, Haidt, & Gable, 2008; Bartlett & DeSteno, 2006; Zahn, et al., 2008).

In our experiment, we exposed participants in a one-on-on interview to true narratives about real people's lives, some of which involved recounting highly virtuous acts that are highly admirable (Immordino-Yang, McColl, Damasio, & Damasio, 2009, in press). For example, in one true story, a young blind woman, despite all odds, learns fluent Tibetan language, invents a computerized Tibetan Braille system to translate texts, and travels to rural Tibet to open a school for blind children, to which she dedicates her life. After learning about stories such as this one, experiment participants were scanned using fMRI (functional magnetic resonance imaging) while they viewed reminder versions of each of the stories and rated the strength of their emotional response. (Psychophysiological data on heart rate change and respiration rate were also collected as corroborating measures.)

Participants who felt a strong emotion of admiration for another person's virtuous accomplishments often spontaneously reported a strong desire to lead better lives themselves, and to accomplish noble deeds. Intriguingly, in addition to the neural signatures of episodic memory, social perspective-taking and various other high-level cognitive processes, the feeling of this motivational emotion state was associated with the recruitment of neural systems related to basic maintenance and sensation of the body, especially of the internal, visceral body (i.e. the "gut"), and systems related to maintenance of consciousness and self-awareness. What was

demonstrated, from a neuropsychological perspective, is that this motivated state, despite its complex cognitive origins, appears not to play out as a purely "rational" process engaged only at the level of the conscious mind. Instead, the feeling of this motivational emotion is deeply rooted in the very systems that keep us alive, that make us act, that organize and regulate the functioning of our body, supporting the notion that the body and mind are dynamically interrelated to motivate meaningful thought and action. Put another way, poetic descriptions of "gut level" feelings or "a heart fluttering with love" may be more than metaphor. Quite literally, the brain appears to use the feeling of the gut as a playground on which to evaluate situations and their accompanying social circumstances.

Relating this to educational research on motivation, what these data reveal is that experiencing this motivating emotion involves two kinds of processing: (1) high level neural systems for consideration of the current circumstances in light of past learning, which leads to cognitive understanding and emotion induction, and (2) low level systems that play out the readiness for action on the body and mind and give the cognitive process its motivating power. This distinction and the contribution of each system are essential. (Think of this as the difference between knowing that engaging in a certain action would be beneficial but not feeling any impetus to begin, versus the motivated behavior that ensues when a person both knows what to do, feels the desire to do it, and satisfies this desire by continuing to persist in pursuit of the desired goal.) Without the cognitive appraisal, no emotion induction ensues; without the induction of low-level processes related to biological regulation and feeling of the body, the cognitive appraisal has no motivating power, no "punch."

Educational research on motivation: Incorporating non-conscious processes into cognitive models

Motivation (at least the variety that is of greatest interest to educators) is a positive and socially contextualized process. That is, educators are largely concerned with promoting learning behaviors that lead to successful academic outcomes. Motivation of an individual is known to be affected by a person's autonomy in relation to others, by a person's perception that he or she is likely to succeed at a task that is valued by others or by society (such as going to college), and by other equivalently social measures of relative self efficacy (Pintrich & Schunk, 2002). Although motivation is surely conjured within an individual person, educationally-relevant motivated states are nonetheless, in this sense, socioemotional and personal (J. Haidt & Morris, 2009, in press). As such, our data on social emotions like admiration can contribute to the study of motivation, and suggest that motivated states involve both high-level cognitive processing that can be available to the conscious mind, and low-level homeostatic processing for the regulation and sensation of basic bodily survival mechanisms and drives.

However, nearly all of the current theories of student motivation in the field of education focus entirely on the importance of conscious cognitive processes, and many of the critical components of these existing theories are generated from self-report measures. While these theories are useful in predicting some aspects of student learning and performance in academic and other settings, they generally provide an inadequate explanation of the underlying processes that give rise to motivated behavior. For example, self-determination theory (e.g. Ryan & Deci, 2000) predicts that students will be more motivated when they feel autonomous and competent but does not offer a satisfying explanation as to *why* this would be. While it has been suggested that future research in the field of motivational science should build models that integrate

nonconscious with conscious processes (Pintrich, 2003), little work on motivation in the field of education has yet moved in this direction.

In light of new evidence from psychology and neuroscience, including the evidence on admiration that we present here, we argue that current educational theories of motivation might gain predictive and explanatory power were they expanded to account for the role of nonconscious processing related to regulation of biological drives and the feeling of the body—in essence, by considering the biological substrates of emotion and feeling as they motivate behavior and thought. An expansion of theories of motivation to include a focus on nonconscious and emotion-related processes could yield new insights into student behavior, leading to testable hypotheses relevant to the field of education. For example, incorporating a nonconscious emotional focus may help to explain why a student may "know" at the conscious level that he should engage in a particular learning behavior, but still not "feel" the impetus to begin or to persist.

This renewed focus on low-level, nonconscious processing in the domain of motivation would mark a departure from current approaches but would not be unprecedented in the history of thought on this topic. Further, this renewed focus on nonconscious processes would be consistent with current trends in cognitive psychology and neuroscience, for example in the study of emotional processing (Phelps & Sharot, 2008), of certain aspects of social processing (Stanley, Phelps, & Banaji, 2008), or of automated and implicit knowledge (Clark, in press; Eitam, Hassin, & Schul, 2008).

A historical perspective on the study of nonconscious motivational processes

While current educational theories of motivation do not focus on nonconscious processes, nonconscious processes have been part of some past theories of motivation. For example, early thinkers in the field of motivation such as Clark Leonard Hull (1884 - 1952) and Sigmund Freud (1856 –1939) placed great emphasis on biological drives and nonconscious processes (originally referred to as unconscious processes). In fact, Freud built an extensive theory of psychotherapy around this concept (e.g. Freud, 1915; Solms, 2004). Other contemporaries of his time were also interested in nonconscious processes, such as Hermann von Helmholtz (1821-1894) who noted that nonconscious processes are central to visual perception, and Friedrich Nietzsche (1844-1900) who focused on the power of nonconscious driving forces. However, Freud was the first to separate philosophical from scientific approaches to consciousness and to use data from his clinical work to support his theories. Freud's basic proposition was that human motivation is largely hidden from conscious reflection and that conscious thought is not the main source of motivation.

Freud's and other's theories on the role of nonconscious processes in motivation were largely rejected as behaviorism became the dominant school of thought in the 1950s. Behaviorism, with its strong focus on observable behaviors, did not place weight on either conscious or nonconscious processes, because it focused on behavior rather than on understanding the mind. Although the cognitive revolution did lift the taboo on the discussion of consciousness in cognitive psychology, psychodynamic psychologists remained alone in arguing for the importance of nonconscious processes in guiding human motivation (Westen, 1998).

In providing this brief historical overview, we are in no way advocating for a wholesale return to early approaches in which all human behavior and motivation could be explained in terms of nonconscious drives (e.g. Hull, 1943). Instead, we argue that something may be lost by

failing to consider the significance of nonconscious processes in modern theories of motivation. There is now accumulating evidence that nonconscious processes play an important role in behavior and thought, and the movement of the field of educational motivation research to accommodate this information would parallel similar trends in cognitive psychology and neuroscience. In our view, it is through considering interactions between high-level cognitive and nonconscious processing that real progress will be made.

Implications for educational research on motivation: Using neuroscience to its best advantage

The time is ripe to build a connection between educational and cognitive neuroscientific research for the purpose of studying motivation. This is because the neuroscientific study of social and affective functioning is gaining unprecedented momentum, and there is now a substantial body of evidence about the neural processes supporting social and emotional systems in the brain (Immordino-Yang & Damasio, 2007; Mitchell, 2008). Recent discoveries in social and affective neuroscience reveal intriguing relationships in the brain between the physiological systems that support social interaction, those that support emotion, and those that support the feeling of the body, especially the gut (Hooker, Verosky, Germine, Knight, & D'Esposito, 2008; Lamm, Batson, & Decety, 2007; Singer, 2006). These relationships suggest that emotion and cognition, feeling and thinking, are fundamentally grounded in the body, and that motivated thought emerges as a function of the interaction between the body and the mind in social and cultural context (Immordino-Yang & Damasio, 2007). While this work remains as yet mainly unconnected to educational constructs such as motivation, some of the processes that are being described in this body of research, such as the neural correlates of feeling admiration for virtue in

our study, have unexplored but potentially interesting and novel implications for educational constructs like motivation.

To conclude, relating these findings back to the argument about the importance of considering nonconscious processing in the study of motivation, what we see is that most current motivation research in education uses self-report measures and other measures of conscious processing, without a way to measure the contributions of more basic, nonconscious systems. In our experiment on the neural correlates of admiration, we have found a way to measure the contribution of these systems using neuroimaging, and the data suggest that the contribution of these nonconscious systems is fundamental. Motivation is a state that appears to involve the body and the mind in a dynamic interaction that produces alertness, arousal, and a profound readiness to engage in meaningful action. As more is learned about the neural bases of these processes, fruitful connections to educational research may become increasingly apparent—provided that educational researchers and cognitive neuroscientists are in productive dialog.

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