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How the social brain experiences empathy: Summary of a gathering

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Explaining how, and even why, the social brain experiences empathy is a complex integrative endeavor that has been explored by scientists of several disciplines working with both animal and human subjects. Current thoughts on empathy and its connection to behavior—prosocial, altruistic, and cruel alike—were explored by scholars in the fields of biology, philosophy, psychology, and anthropology at a conference in Chicago. The speakers' individually unique perspectives merged to provide an inclusive overview of the biological basis of, and cultural influences upon, empathy. The nature of empathy in nonhuman animals, the endocrine requirements for empathy, the effects of empathy on moral behavior, the social nature of pain, the relation between empathy and altruism, the ethnography of empathy, and empathy in the medical setting were discussed. The interdisciplinary nature of the conference demonstrated the advantages of communicating findings across fields while also delineating the difficulties that can stem from the existence of multiple approaches to, and definitions of, empathy. Future progress will be aided by working toward common definitions for empathy, sympathy, altruism, and so on, in concert with cross-disciplinary dialogues that allow practitioners of each discipline to be informed by paradigms and findings from complementary disciplines.

Keywords: Altruism; Empathy; Pro-social behavior; Sympathy; Morality.

INTRODUCTION

Empathy, the natural capacity to share, appreciate and respond to the affective states of others, plays a crucial role in much of human social interaction from birth to the end of life. Empathy is thought to have a key role in motivating prosocial behavior and providing the affective and motivational bases for moral development. These are just a few reasons to be interested in empathy. For a very long time, empathy has been a focus of speculation in philosophy and in the empirical investigations of social psychology and developmental science. But in the past decade, empathy research has blossomed into a vibrant and multidisciplinary field of study, appealing to those in cognitive psychology, evolutionary biology, and affective neuroscience.

On the last day of September 2009, academics from around North America gathered to hear seven

perspectives on “How the Social Brain Experiences Empathy.” The conference was organized by Jean Decety of the University of Chicago and funded by the Center for Cognitive and Social Neuroscience at the University of Chicago with additional funds provided by the Templeton Foundation. The conference notably brought together scholars from disparate disciplines, all of whom approached empathy from different perspectives. Varied definitions of and approaches to empathy, sympathy, and altruism were advanced throughout the day. Yet participants converged on several unified conclusions, such as the likelihood that prosocial behavior and ultimately empathy evolved from parental care.

John Cacioppo, director of the Center for Cognitive and Social Neuroscience, eloquently opened the conference describing empathy as an invisible force whose presence brings out our best and whose

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absence, or indeed abuse, permits atrocities. Appropriately, Frans de Waal, a primatologist and leading proponent of the idea that nonhuman primates act empathically (de Waal, 2005), began the discussion. De Waal opened by distinguishing between top-down and bottom-up types of empathy, which he defined as the ability to understand and share the feelings of another. Bottom-up empathy draws from synchronization of behavior, as when a yawn spreads through a group of chimps or humans. Examples of emotional contagion and state-matching are pervasive throughout the mammalian class, as when a baby wolf starts howling after observing its parent's howling. More complex empathy involving concern for others and targeted helping is present in apes but not monkeys, and may be related to the presence of mirror self-recognition in apes but not monkeys. In support of this idea, de Waal showed evidence that elephants, which show consolatory behavior—a form of empathy—recognize themselves if provided with a large enough mirror (Plotnik, de Waal & Reiss, 2006). Since children with mirror self-recognition show consolation and targeted helping, de Waal suggested that mirror self-recognition and complex forms of empathy develop together in both phylogeny and ontogeny. The highest level of empathy derives from perspective-taking, which allows one to perceive another's emotional state even when it is different from one's own. Yet even this top-down version of empathy depends on the more rudimentary forms of empathy that form its inner substrate. Thus empathy is an ancient capacity which in its most developed form allows an individual to cognitively comprehend another's situation even in the absence of matching the autonomic, somatic, and emotional state of the other. Empathy itself, defined as the ability to understand another's situation combined with a separation between self and other, is neutral, wedded neither to advancing good nor to promoting bad. While empathy is separate from empathic concern, it can be, and often is, used as a strong motivation for prosocial activities that advance the welfare of others, a likely precursor of empathic concern.

Sue Carter, a leader in the study of the role of hormones in social behavior (Carter, 2006), refrained from discussing empathy directly while making the compelling argument that the basic biology of sociality and social bonding will inevitably help our understanding of empathy. Carter emphasized the survival value of sociality—no mammal survives alone—and the idea that the mother–infant relationship is the prototype for sociality. Critical to motherhood during both birth and lactation are oxytocin and vasopressin, hormones with phylogenetically conserved roles in

social and reproductive behavior in vertebrates and invertebrates alike (Donaldson & Young, 2008). Fundamentally, it appears that in rodents, oxytocin facilitates approach, social engagement, and perhaps a sense of safety while vasopressin suppresses approach behaviors and increases avoidance associated with a sense of fear and impending threat. Carter has utilized the modern cultural experiment of bottle-feeding to test the effects of oxytocin in human females. Women who breast-fed their babies, and presumably have elevated circulating levels of oxytocin, were compared to women who bottle-fed their babies. Breast-feeding mothers were less reactive to both physiological and social stressors than were bottle-feeding mothers (Altemus, Deuster, Galliven, Carter, & Gold, 1995) while being more sensitive to stimuli arising from their babies. Carter cautioned that hormones act differently under different contexts—think social isolation. In sum, Carter argued that the communication of emotions between individuals utilizes subcortical pathways, most notably those in the brainstem. Thus, biology is an important part of the empathy equation, albeit not the only variable.

Nancy Eisenberg, a developmental psychologist and author of the acclaimed *Empathy and its Development* (Eisenberg, 1990), focused on the roles of empathy and personal distress in moral development. A meta-analysis published in the early 1980s concluded that no relationship existed between empathy and prosocial or moral behavior (Underwood & Moore, 1982). Eisenberg addressed this issue anew by recording physiological (heart rate and skin conductance), somatic (facial expression), and psychological (self and friend report) measures in a prospective cohort. The initial question asked was whether sympathy, a positively concerned version of empathy, predicted prosocial behavior or actions intended to benefit another. Indeed, young children who reacted to a film with bradycardia, lowered skin conductance, and a sad face predictably responded prosocially. Furthermore, spontaneous prosocial behavior during infancy was the *only* predictor of the helpfulness and generosity, as reported by self and others, exhibited by individuals in their twenties. Importantly, Eisenberg found that personal distress produced a sort of paralysis, keeping the focus on the self, and strongly inhibited prosocial behavior. Thus, to use sympathy as a motivation for behavior, an individual must exert effortful control over his or her own emotions in order to shift focus to the other and behave as though the other's interests were paramount.

Jean Decety, a neuroscientist delving into the brain substrates for empathy (Decety and Ickes, 2009), emphasized the social nature of pain. Pain experienced

by others motivates helping behaviors when it engenders feelings of empathy but is unlikely to do so in the absence of empathy. Remarkably, similar regions of the brain, regions that are termed the pain matrix, are activated when one watches pain—second-hand pain—as when one experiences pain first-hand. The level of activation is greatest when one sees oneself experiencing pain, very high when one sees a loved one experiencing pain, and low when one sees a stranger experiencing pain (Jackson, Brunet, Meltzoff, & Decety, 2006; Singer et al., 2004). Such empathy comes with costs. There are the physiological costs associated with the arousal inherent in feelings of empathy as well as material costs associated with any potential acts of altruism. In order to reduce these costs, experts self-regulate and thereby dampen their emotional arousal and empathic reactions. For example, physicians rate the pain of needle insertion much lower than do laypeople. Concurrently, physicians show far less activation within the pain matrix in response to viewing needle insertion than do laypeople. At the same time, physicians watching needle insertion show strong activation in the prefrontal cortex, a region important in executive function and presumably a substrate for self-regulation (Cheng et al., 2007). The benefits of self-regulation are to minimize feelings of alarm and fear which in turn frees up physiological resources that can be used to assist another in pain. While we inherited the faculty of empathy from our evolutionary ancestors, we have the cerebral capacity to dissociate our empathic feelings and understanding from our behavioral response and thereby act with cognitive detachment.

Dan Batson, a social psychologist interested in the connection between empathy and altruism (Batson, 1991), focused on the question of whether we aid another for the other's sake or for our own sake. Batson argued that it is important to distinguish between altruism, an act that has the ultimate goal of increasing another's welfare, and egoism, an act aimed at increasing one's own welfare. While either altruism or egoism can motivate behavior, Batson's notion of altruism requires that benefiting another be the ultimate goal and any self benefit be an unintended consequence. Only when we understand the rules dictating altruism and egoism can we know when to expect each to occur and what conditions will tip the balance to one or the other type of action. According to Batson, perceiving another to be in need coupled with the valuation of the other's welfare produces empathic concern. A prediction of the hypothesis that empathy evolved as a generalized form of instinctual parental care is that empathy should be strongest toward individuals who are most similar to

one's progeny rather to oneself. Providing some support for this idea, university students showed more empathic concern for children, and puppies in fact, than for other students (Batson, Lishner, Cook, & Sawyer, 2005). As suggested by an audience member, a potentially more direct test of the empathy-for-progeny hypothesis would be to test the level of empathy shown by parents of university students toward either university students or young children. Finally, Batson proposed that while empathy can lead to altruism, increased cooperation and less stigmatization of others, it can also be a motivation for paternalistic behavior and indeed systemized nepotism.

In introducing Allan Young, an anthropologist interested in the ethnography of empathy (Young, 1997), Decety warned the audience, "Prepare to be disturbed." Young argued that reciprocal altruism, as proposed by Trivers in the 1970s (Trivers, 1971), could only have operated in small groups of directly interacting people. During Paleolithic times, people became dispersed. As a result, the people potentially involved in reciprocal acts and the intervals between the occurrences of altruistic acts were too remote to result in an advantage. Thus, early people needed to remember the actors and circumstances involved in altruism. One inevitable consequence of such calculated altruism was cheating. Cheating begat punishment by self-selected individuals, termed enforcers. Yet punishment is irrational on the part of the punishers since no material reward results. Instead, Young argued that enforcers evolved to derive a reward, a brain-mediated jolt of dopamine, from meting out punishment. The reward associated with punishment is fertile soil for gloating and cruelty, antisocial behaviors decoupled from empathic concern. Further, upon the establishment of a group of enforcers, non-enforcers instantly became secondary cheaters as they stood to benefit, undeservedly, from the actions of enforcers. Young also proposed that empathy starts with the *self*. Using what Young called "subjunctive time travel," and extending the concept of "other" to include the past or future self, it is possible for a single individual to have empathy. The empathic person pairs feelings for the past self, the other in this case, with feelings for the current self. This perspective reveals the important contribution of tenderness for the self along with tenderness for the other. Under this rubric, cheaters cheat themselves first and foremost, deluding themselves to suppress the true nature of their actions in their own internal narrative. In this unique view, empathy is the culmination of historical rather than biological factors and has produced as much cruelty, harm to another at a cost to the self, as benefit.

In the final talk, Jodi Halpern, a clinical psychiatrist and bioethicist and author of the acclaimed *From Detached Concern to Empathy: Humanizing Medical Practice* (Halpern, 2001), examined issues concerning empathy in a medical setting. Halpern asked what type of emotional engagement patients benefit from. Key to a successful and helpful interaction is nonverbal attunement. In other words, patients prefer an engaged physician who reacts to what they do and how they hold themselves. Important to a physician's ability to understand a patient's situation is the ability to vividly imagine the patient's situation. This does not mean that the physician puts *herself* in the position of the patient; rather the physician must imagine how *the patient* feels to be in the patient's current circumstances. Since emotions are learned by associating feelings with experiences, they are uniquely individual. One person's happiness is another's misery. Therefore, in learning to effectively imagine a patient's emotional reactions, and to recognize both the similarities and differences to their own emotions, a physician faces a daunting challenge. Halpern suggested that one simple tack for a physician to take is to simply ask a patient, "What am I missing?" Since a genuine trust between patient and physician is the critical factor in treatment adherence, making a patient feel that a physician truly cares about them is critical to a good medical outcome. Finally, Halpern addressed the importance of physicians' self-regulating. Too much engagement on the part of a physician centers the physician in their own feelings and prevents the physician from taking the patient's perspective. Too much engagement is a recipe for burnout. In sum, Halpern's prescription for effective communication with patients requires nonverbal attunement, imagination, and empathic concern. Physicians who follow this approach will enjoy patients with high compliance rates and consequently improved health.

In conclusion, the multidisciplinary perspective on empathy provides a rich and textured picture of the mechanisms, expressions, social function, and cultural significance of empathy. As with all good science, the number of questions raised by the day's talks greatly exceeded those answered and was in turn surpassed by the level of enthusiasm for future investigation into empathy in all its dimensional glory.

The clear message of the day was that we benefit from using all tools possible as we explore psychiatric conditions of disordered or abnormal empathy such as psychopathy. Trying to understand psychopathy and other impairments of empathy and their related behaviors requires an examination of development, hormones and physiology, brain structure and function, behavior,

personality, and social context. By focusing on fundamental mechanisms of the brain and behavior rather than on discrete psychiatric disorders, we can gain insights into therapeutic interventions that may be applied to a range of disorders. In this way, the fundamental approach offers the biggest pay-off in the final analysis.

One of the questions raised goes to the very heart of the multidisciplinary approach. While every speaker talked about empathy, no two speakers had precisely the same definition for either empathy or the related concepts of sympathy, prosocial behavior, altruism, and so on. The complex construct of empathy is useful at the phenomenological level—we need words to navigate the social world. Yet is it too complex to be both meaningful and useful across disciplines? Certainly the behaviors associated with or triggered by what speakers called "empathy" were heterogeneous in the extreme, ranging from motor mimicry, emotional contagion, and imagination of others' feelings, to altruism, sympathy, cruelty, and so on. While the different disciplines' ideas of empathy clearly have something in common, one could justifiably question the heuristic or conceptual advantages of a monolithic concept of empathy. This serious reservation highlights the need for a more careful conceptualization of empathy. Our future understanding of empathy, whether derived from the social sciences, biological sciences, or economics, will benefit from such a fine conceptual analysis.

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