

12 compassion sig abstracts, february '12

(Bargh and Shalev 2012; Bedics, Atkins et al. 2012; Chiang, Eisenberger et al. 2012; Eisenberger 2012; Engelen and Röttger-Rössler 2012; Feldman, Zagoory-Sharon et al. 2012; Gray, Beacher et al. 2012; Inagaki, Muscatell et al. 2012; Masten, Telzer et al. 2012; Meyer, Masten et al. 2012; Smith, Uchino et al. 2012; Walter 2012)

Bargh, J. A. and I. Shalev (2012). "The substitutability of physical and social warmth in daily life." *Emotion* **12**(1): 154-162. <http://www.ncbi.nlm.nih.gov/pubmed/21604871>.

Classic and contemporary research on person perception has demonstrated the paramount importance of interpersonal warmth. Recent research on embodied cognition has shown that feelings of social warmth or coldness can be induced by experiences of physical warmth or coldness, and vice versa. Here we show that people tend to self-regulate their feelings of social warmth through applications of physical warmth, apparently without explicit awareness of doing so. In Study 1, higher scores on a measure of chronic loneliness (social coldness) were associated with an increased tendency to take warm baths or showers. In Study 2, a physical coldness manipulation significantly increased feelings of loneliness. In Study 3, needs for social affiliation and for emotion regulation, triggered by recall of a past rejection experience, were subsequently eliminated by an interpolated physical warmth experience. Study 4 provided evidence that people are not explicitly aware of the relationship between physical and social warmth (coldness), as they do not consider a target person who often bathes to be any lonelier than one who does not, with all else being equal. Together, these findings suggest that physical and social warmth are to some extent substitutable in daily life and that this substitution reflects an unconscious self-regulatory mechanism.

Bedics, J. D., D. C. Atkins, et al. (2012). "Treatment differences in the therapeutic relationship and introject during a 2-year randomized controlled trial of dialectical behavior therapy versus nonbehavioral psychotherapy experts for borderline personality disorder." *J Consult Clin Psychol* **80**(1): 66-77. <http://www.ncbi.nlm.nih.gov/pubmed/22061867>.

OBJECTIVE: The present study explored the role of the therapeutic relationship and introject during the course of dialectical behavior therapy (DBT; Linehan, 1993) for the treatment of borderline personality disorder. METHOD: Women meeting DSM-IV criteria for borderline personality disorder (N = 101) were randomized to receive DBT or community treatment by experts. The Structural Analysis of Social Behavior (Benjamin, 1974) was used to measure both the therapeutic relationship and introject. RESULTS: Relative to community treatment by experts, DBT participants reported the development of a more positive introject, including significantly greater self-affirmation, self-love, self-protection, and less self-attack, during the course of treatment and 1-year follow-up. The therapeutic relationship did not have an independent effect on intrapsychic or symptomatic outcome but did interact with treatment. DBT participants who perceived their therapist as affirming and protecting reported less frequent occurrences of nonsuicidal self-injury. CONCLUSIONS: The study showed positive intrapsychic change during DBT and emphasized the importance of affirmation and control in the therapeutic relationship. Results are discussed in the context of understanding the mechanisms of change in DBT.

Chiang, J. J., N. I. Eisenberger, et al. (2012). "Negative and competitive social interactions are related to heightened proinflammatory cytokine activity." *Proc Natl Acad Sci U S A* **109**(6): 1878-1882. <http://www.ncbi.nlm.nih.gov/pubmed/22308464>.

Research has consistently documented that social relationships influence physical health, a link that may implicate systemic inflammation. We examined whether daily social interactions predict levels of proinflammatory cytokines IL-6 and the soluble receptor for tumor necrosis factor- α (sTNF α R_{II}) and their reactivity to a social stressor. One-hundred twenty-two healthy young adults completed daily diaries for 8 d that assessed positive, negative, and competitive social interactions. Participants then engaged in laboratory stress challenges, and IL-6 and sTNF α R_{II} were collected at baseline and at 25- and 80-min poststressor, from oral mucosal transudate. Negative social interactions predicted elevated sTNF α R_{II} at baseline, and IL-6 and sTNF α R_{II} 25-min poststressor, as well as total output of sTNF α R_{II}. Competitive social interactions predicted elevated baseline levels of IL-6 and sTNF α R_{II} and total output of both cytokines. These findings suggest that daily social interactions that are negative and competitive are associated prospectively with heightened proinflammatory cytokine activity.

Eisenberger, N. I. (2012). "The neural bases of social pain: Evidence for shared representations with physical pain." *Psychosomatic Medicine* **74**(2): 126-135. <http://www.psychosomaticmedicine.org/content/74/2/126.abstract>.

Experiences of social rejection or loss have been described as some of the most "painful" experiences that we, as humans, face and perhaps for good reason. Because of our prolonged period of immaturity, the social attachment system may have co-opted the pain system, borrowing the pain signal to prevent the detrimental consequences of social separation. This review summarizes a program of research that has explored the idea that experiences of physical pain and social pain rely on shared neural substrates. First, evidence showing that social pain activates pain-related neural regions is reviewed. Then, studies exploring some of the expected consequences of such a physical pain-social pain overlap are summarized. These studies demonstrate that a) individuals who are more sensitive to one kind of pain are also more sensitive to the other and b) factors that increase or decrease one kind of pain alter the other in a similar manner. Finally, what these shared neural substrates mean for our understanding of socially painful experience is discussed.

Engelen, E.-M. and B. Röttger-Rössler (2012). "Current disciplinary and interdisciplinary debates on empathy." *Emotion Review* **4**(1): 3-8. <http://emr.sagepub.com/content/4/1.toc?etoc>.

Almost anybody writing in the field would declare that there is no accepted standard definition of empathy—either among the sciences and humanities or in the specific disciplines. However, even when accepting that there can be no all-time and universally valid definition, one can still try to clarify some aspects and establish a few landmarks that will help to ensure that the phenomenon with which various researchers are dealing is the same, or has at least important features in common. Although there is no established concept, several topics and discussions have proved to be crucial for the phenomenon that was once given this specially made-up label empathy by Edward Titchener (1909), who introduced this word into English at the beginning of the 20th century in order to translate the German term *Einfühlung*. The idea behind this special section on empathy is to present a range of the currently most lively topics and discussions to be found not only within several disciplines, but also across several disciplinary boundaries. Authors from different disciplines were asked to contribute to the field in a style that would be accessible for a broader range of interested readers. These contributions come from the following disciplines in which empathy is either an ongoing or an upcoming topic of academic interest: neuropsychology, developmental psychology, philosophy, literary studies, and anthropology. The commentators giving their views on the articles are sometimes experts on empathy from the same discipline as the authors and sometimes from adjoining ones.

Feldman, R., O. Zagoory-Sharon, et al. (2012). "Sensitive Parenting is Associated with Plasma Oxytocin and Polymorphisms in the OXTR and CD38 Genes." *Biol Psychiatry*. <http://www.ncbi.nlm.nih.gov/pubmed/22336563>.

BACKGROUND: Research in mammals has demonstrated the involvement of oxytocin (OT) in social bond formation; yet, its role in human bonding remains unclear. Plasma OT has been used as a proxy for central activity and studies indicate its association with human affiliative behaviors. Molecular genetic studies also reveal a role for OT neuropathways in shaping the social brain. However, the links between peripheral OT, genetic markers, and their combined contribution to human parenting are unknown. **METHODS:** Participants included 352 individuals: 272 mothers and fathers and their 4- to 6-month-old-infants and 80 nonparents. Plasma OT was assayed from adults who were genotyped for oxytocin receptor (OXTR) and CD38 risk alleles associated with social dysfunctions. CD38 is an ectoenzyme that mediates the release of brain OT. Parent-infant interactions were microcoded for parental touch and gaze synchrony and participants reported on parental care in childhood. **RESULTS:** OXTR (rs2254298 and rs1042778) and CD38 (rs3796863) risk alleles were each associated with lower plasma OT. Reduced plasma OT and both OXTR and CD38 risk alleles were related to less parental touch. The interaction of high plasma OT and low-risk CD38 alleles predicted longer durations of parent-infant gaze synchrony. Parents reporting greater parental care showed higher plasma OT, low-risk CD38 alleles, and more touch toward their infants. **CONCLUSIONS:** Results indicate that peripheral and genetic markers of the extended OT pathway are interrelated and underpin core behaviors associated with human parenting and social engagement. These findings may have important implications for understanding neuropsychiatric disorders marked by early social dysfunctions.

Gray, M. A., F. D. Beacher, et al. (2012). "Emotional appraisal is influenced by cardiac afferent information." *Emotion* **12**(1): 180-191. <http://www.ncbi.nlm.nih.gov/pubmed/21988743>.

Influential models highlight the central integration of bodily arousal with emotion. Some emotions, notably disgust, are more closely coupled to visceral state than others. Cardiac baroreceptors, activated at systole within each cardiac cycle, provide short-term visceral feedback. Here we explored how phasic baroreceptor activation may alter the appraisal of brief emotional stimuli and consequent cardiovascular reactions. We used functional MRI (fMRI) to measure brain responses to emotional face stimuli presented before and during cardiac systole. We observed that the processing of emotional stimuli was altered by concurrent natural baroreceptor activation. Specifically, facial expressions of disgust were judged as more intense when presented at systole, and rebound heart rate increases were attenuated after expressions of disgust and happiness. Neural activity within prefrontal cortex correlated with emotionality ratings. Activity within periaqueductal gray matter reflected both emotional ratings and their interaction with cardiac timing. Activity within regions including prefrontal and visual cortices correlated with increases in heart rate evoked by the face stimuli, while orbitofrontal activity reflected both evoked heart rate change and its interaction with cardiac timing. Our findings demonstrate that momentary physiological fluctuations in cardiovascular afferent information (1) influence specific emotional judgments, mediated through regions including the periaqueductal gray matter, and (2) shape evoked autonomic responses through engagement of orbitofrontal cortex. Together these findings highlight the close coupling of visceral and emotional processes and identify neural regions mediating bodily state influences on affective judgment.

Inagaki, T. K., K. A. Muscatell, et al. (2012). "Inflammation selectively enhances amygdala activity to socially threatening images." *Neuroimage* **59**(4): 3222-3226. <http://www.ncbi.nlm.nih.gov/pubmed/22079507>.

Although social withdrawal is a prominent symptom of sickness, the mechanisms associated with this behavioral change remain unclear. In animals, the amygdala is a key neural region involved in sickness-induced social withdrawal. Consistent with this, in humans, heightened amygdala activity to negative social cues is associated with social avoidance tendencies. Based on these findings, we investigated whether an experimental inflammatory challenge selectively increased amygdala activity to socially threatening images as well as whether this activity related to feelings of social disconnection. Thirty-nine participants were randomly assigned to receive either placebo or low-dose endotoxin, which increases inflammatory activity. Pro-inflammatory cytokines were assessed at 7 hourly time points via blood draws; self-reported feelings of social disconnection and physical sickness symptoms were assessed hourly as well. Two hours post-injection, participants underwent an fMRI procedure to assess amygdala reactivity during the presentation of socially threatening images (fear faces) as well as non-socially threatening images (guns), socially non-threatening images (happy faces), and non-social, non-threatening images (household objects). Endotoxin led to greater amygdala activity in response to socially threatening vs. all other types of images. No such differences were found for placebo participants. Additionally, increased amygdala activity in endotoxin participants during the viewing of socially vs. non-socially threatening images was associated with increased feelings of social disconnection. These findings highlight the amygdala as a neural region that may be important for sickness-induced social withdrawal. The implications of amygdala involvement in sickness-induced social withdrawal are discussed.

Masten, C. L., E. H. Telzer, et al. (2012). "Time spent with friends in adolescence relates to less neural sensitivity to later peer rejection." *Soc Cogn Affect Neurosci* **7**(1): 106-114. <http://www.ncbi.nlm.nih.gov/pubmed/21183457>.

Involvement with friends carries many advantages for adolescents, including protection from the detrimental effects of being rejected by peers. However, little is known about the mechanisms through which friendships may serve their protective role at this age, or the potential benefit of these friendships as adolescents transition to adulthood. As such, this investigation tested whether friend involvement during adolescence related to less neural sensitivity to social threats during young adulthood. Twenty-one adolescents reported the amount of time they spent with friends outside of school using a daily diary. Two years later they underwent an fMRI scan, during which they were ostensibly excluded from an online ball-tossing game by two same-age peers. Findings from region of interest and whole brain analyses revealed that spending more time with friends during adolescence related to less activity in the dorsal anterior cingulate cortex and anterior insula--regions previously linked with negative affect and pain processing--during an experience of peer rejection 2 years later. These findings are consistent with the notion that positive relationships during adolescence may relate to individuals being less sensitive to negative social experiences later on.

Meyer, M. L., C. L. Masten, et al. (2012). "Empathy for the social suffering of friends and strangers recruits distinct patterns of brain activation." *Soc Cogn Affect Neurosci*. <http://www.ncbi.nlm.nih.gov/pubmed/22355182>.

Humans observe various peoples' social suffering throughout their lives, but it is unknown whether the same brain mechanisms respond to people we are close to and strangers' social suffering. To address this question, we had participant's complete functional magnetic resonance imaging (fMRI) while observing a friend and stranger experience social exclusion. Observing a friend's exclusion activated affective pain regions associated with the direct (i.e. firsthand) experience of exclusion [dorsal anterior cingulate cortex (dACC) and insula], and this activation correlated with self-reported self-other overlap with the friend. Alternatively, observing a stranger's exclusion activated regions associated with thinking about the traits, mental states and intentions of others ['mentalizing'; dorsal medial prefrontal cortex (DMPFC), precuneus, and temporal pole]. Comparing activation from observing friend's vs stranger's exclusion showed increased activation in brain regions associated with the firsthand experience of exclusion (dACC and anterior insula) and with thinking about the self [medial prefrontal cortex (MPFC)].

Finally, functional connectivity analyses demonstrated that MPFC and affective pain regions activated in concert during empathy for friends, but not strangers. These results suggest empathy for friends' social suffering relies on emotion sharing and self-processing mechanisms, whereas empathy for strangers' social suffering may rely more heavily on mentalizing systems.

Smith, T. W., B. N. Uchino, et al. (2012). "Marital discord and coronary artery disease: a comparison of behaviorally defined discrete groups." *J Consult Clin Psychol* **80**(1): 87-92. <http://www.ncbi.nlm.nih.gov/pubmed/22182260>.

OBJECTIVE: Marital difficulties can confer risk of coronary heart disease, as in a study of outwardly healthy couples (T. W. Smith et al., 2011) where behavioral ratings of low affiliation and high control during marital disagreements were associated with asymptomatic coronary artery disease (CAD). However, taxometric studies suggest that marital discord is more accurately represented by discrete groups, rather than continuous dimensions. To determine if a categorical representation of marital discord was also related to CAD, discordant and nondiscordant groups were identified via cluster analysis in further analyses of the T. W. Smith et al. (2011) study. METHOD: One hundred fifty healthy couples (M age = 63.5) completed a marital disagreement discussion, self-reports of anxiety and anger during the disagreement, and self-report measures of marital adjustment. CAD was measured as coronary artery calcification (CAC) via computed tomography scans. RESULTS: In a 2-group cluster solution, 31% of couples were characterized as discordant, with higher levels of hostility and dominance and lower levels of warmth compared with the nondiscordant group. Discordant couples reported lower marital adjustment and greater negative affect during the discussion. Controlling biomedical and behavioral risk factors, discordant couples had greater CAC ($p = .029$, $\eta^2 = .035$). Discordant and nondiscordant groups defined via self-reported marital adjustment did not differ in CAC ($p = .17$, $\eta^2 = .014$). CONCLUSIONS: Marital discord defined categorically and with behavioral observations was associated with greater levels of asymptomatic CAD. Marital discord is associated with higher risk at early stages of coronary heart disease, but commonly used self-reports may underestimate this risk.

Walter, H. (2012). "Social Cognitive Neuroscience of Empathy: Concepts, Circuits, and Genes." *Emotion review* **4**(1): 9-17. <http://emr.sagepub.com/content/4/1/9.abstract>.

This article reviews concepts of, as well as neurocognitive and genetic studies on, empathy. Whereas cognitive empathy can be equated with affective theory of mind, that is, with mentalizing the emotions of others, affective empathy is about sharing emotions with others. The neural circuits underlying different forms of empathy do overlap but also involve rather specific brain areas for cognitive (ventromedial prefrontal cortex) and affective (anterior insula, midcingulate cortex, and possibly inferior frontal gyrus) empathy. Furthermore, behavioral and imaging genetic studies provide evidence for a genetic basis for empathy, indicating a possible role for oxytocin and dopamine as well as for a genetic risk variant for schizophrenia near the gene ZNF804A.