Emotion Researcher

ISRE's Sourcebook for Research on Emotion and Affect

http://emotionresearcher.com

June 2020

Editors

Cain Todd   Eric A. Walle

Lancaster University   University of California, Merced
c.todd@lancaster.ac.uk   ewalle@ucmerced.edu

Table of Contents

Editors' Column

Evolutionary and Cultural Contexts of Emotion

Cain Todd & Eric A. Walle

This issue focuses on the complex issue of the evolution of emotion. How one views the evolutionary history and adaptive functions of emotions will have a profound impact on one's views about the nature of emotions, about the function of specific emotions, and about the evaluative and normative dimensions of emotional experiences. It is therefore of great importance to construct a multi-disciplinary overview of this topic.

Our first feature article is by Randolph Nesse, Foundation Professor of Life Sciences, and Founding Director of The Center for Evolution and Medicine, Arizona State University, who has published widely on evolutionary psychiatry and medicine and emotional disorders. In this article he argues that quantitative studies of emotions suffer from a problem he calls 'tacit creationism', which is the idea that emotions are assumed to be aspects of designed machines and as such can be readily defined and differentiated in terms of their number, nature and function. As such, he claims, these studies offer a too simplistic picture of emotions, which ignores the fact that they are "organically complex systems whose structures and functions are radically different from those of machines".

Our second article is by Courtney Crosby, a graduate student in psychology at the University of Austin, Texas, and David Buss, Professor of Psychology at the same institution, who is an expert on the evolutionary psychology of 'negative' emotions. Their paper addresses the question of what adaptive challenges sexual disgust might have evolved to solve, in the process noting important differences in sexual disgust between the sexes, and complex interactions between sexual disgust and other emotions. Identifying six core dimensions of sexual disgust, the authors discuss evidence that suggests it might be directed towards multiple domains, including pathogen transmission, incest avoidance, harm avoidance, reputational damage, and the loss of valuable resources or mates. In light of this, the authors propose some directions for future research.

Daniel Kelly, Professor of Philosophy at Purdue University, contributed our third article. His research focuses, amongst other things, on moral psychology and evolution, and in this piece he explores the psychological foundations of norm-guiding behaviour. He suggests that *normative motivation* picks out a distinctive category of mental state – a psychological natural kind that occupies a middle tier in the hierarchy of the human mind. This mental state, he claims, has important connections to emotion and affect, and is crucial to explaining important moral and social dimensions of human behaviour.

In their different ways, each of these articles points to connections between the evolutionary history of emotions and their various normative or social functions. Each also raises methodological issues, problems underpinning empirical emotion research, and suggestions for further inquiry on this fascinating topic.

ISRE Spotlight

Our Spotlight feature highlights the research of Jozefien De Leersnyder, Research Professor at the Center for Social and Cultural Psychology, KU Leuven, Belgium. Her research focuses on emotional experience from a cultural psychological perspective and in this piece she gives an overview of several important questions she has pursued, namely: whether the emotional patterns of immigrant minorities can *change* upon repeated exposure to and engagement in the majority context; whether people would benefit from being emotionally similar to others in their cultural context; and *how* emotional fit may come about in intercultural interactions. Her programmatic research on these topics is applicable to a range of important contemporary social issues, providing evidence for a deep and dynamic socio-cultural shaping of emotional experience.

Announcements

We would like to note that this year Carolyn Price stepped down as Co-editor of *Emotion Researcher*. She was an excellent collaborator

(and wrangler of articles) as Co-Editor and has our sincere thanks for her service to this publication. Relatedly, we are fortunate to announce that her position has been taken up by Cain Todd. Cain is excited to be taking over from Carolyn, particularly as his own work on emotion and other topics that bear on emotion has become increasingly interdisciplinary. He is very much looking forward to using future issues to explore the many faces of emotions and emotion research.

We would also like to apologize for the delay in publishing this issue of *Emotion Researcher*. Rest assured that we plan to get back into putting out 3-4 issues each year. Indeed, we are already working on the next issue of *Emotion Researcher*, which will cover the topic of Emotion and Memory.

Finally, we are always on the lookout for suggestions of emotion scholars to interview for an issue of Emotion Researcher. While we were, unfortunately, unable to fulfill this segment in the present issue, we fully intend to continue the tradition of featuring renowned scholars of emotion in subsequent issues. If you have someone in mind who you think may have an interesting professional and personal story to share, please do not hesitate to contact Cain & Eric by email.

In closing, we hope that all of you are managing to stay healthy and safe in these unusual times. Now more than ever, it is crucial that we prioritize our shared scholarship on emotion with an emphasis on the interdisciplinary, international, and collaborative spirit on which ISRE was founded.

Warmly,

Eric & Cain

Cain Todd is Senior Lecturer in Philosophy at Lancaster University (UK). His research covers a wide range of issues centring on emotions and evaluative experience, most recently the phenomenology and objectivity of emotional experience and the role of attention and imagination therein. His co-edited collection *Emotion and Value* (OUP) was published in 2010, and his new monograph *Aesthetics and Emotion* (Bloomsbury) will appear in 2021.

Eric Walle is an Associate Professor of Psychological Sciences at the University of California, Merced. His theoretical writings emphasize the functions of emotions, particularly in interpersonal contexts. His empirical work examines emotional development, principally in infancy and early childhood, as well as how individuals perceive and respond to emotional communication.

ISRE Matters

Ursula Hess

Professor of Social and Organizational
Psychology, Department of Psychology
Humboldt University, Berlin
Ursul.Hess@hu-berlin.de

I am deeply honored to have been elected President of ISRE. ISRE has been my intellectual home as an emotion researcher since I joined in 1992. In those years much has changed with regard to the appreciation of the role of emotions in our lives.

In fact, when I started my undergraduate studies in psychology at the University of Giessen, Klaus Scherer, who was my mentor and supervisor in Giessen, had just recently published a paper deploring the neglect of emotions in psychological research. And I myself in 2003 wrote a paper pointing to the neglect of emotion is organizational psychology. How times have changed. Now emotions are firmly entrenched in many research traditions. And this points to another hugely important point – emotion research is inherently multidisciplinary. As emotions infuse our lives, so the study of emotions covers all the different aspects of life and not only human life. In this sense, ISRE is proud to claim scholars from many different disciplines among its members.

The current edition of Emotion Researcher features three articles that highlight evolutionary thinking about emotions. Randolph Nesse addresses one of the most longstanding issues in emotion research: what are emotions and what are their functions. He points out that these questions by their very nature suggest "tacit creationism"- the very notion that emotions are things with functions suggests an underlying machine metaphor. Rather, "*emotions are special states shaped by natural selection that give selective advantages when expressed in situations where they have given fitness advantages over evolutionary time.*" They are both similar and different across individuals and

Ursula Hess, ISRE President

cultures because they were shaped by the situations encountered over evolutionary times and are a results of differences in these experiences as well as genes and culture (which in turn influence each other). Hence it does not make sense to seek uniformity or differences in emotion expression and experience but rather one should focus on the situations that elicit them and the meaning that these situations have for those who encounter them. This call –- to which appraisal theories of emotion can respond – as well as the notion that negative emotions have a positive role to play resonates with my own thinking in these matters.

This article has an interesting link to the spotlight article by Jozefien De Leersnyder which presents a socio-cultural fit perspective on Emotions, which sees emotions as an act of making meaning – a process that cannot be thought of without the cultural and individual differences that shape it.

The second featured article, by Courtney L. Crosby and David M. Buss, focuses on sexual disgust. Yet, central to disgust is pathogen avoidance and while this is not central to the notions discussed here, it is an aspect that

resonates now maybe more than ever. The link between fear of infection and the rejection of others is well established and it is one of the dangers of our present difficult times.

This notion provides a link to the next article, which focuses on the notion that norms provide motivation. Normative motivations may not be basic or psychologically primitive, but they structure and regulate our behavior. What resonated with me was the notion that, as humans, we can sit down and decide what norms to adopt. We can decide to keep distances and wear masks and stay committed to this new norm.

Before I end, I want to give a short outlook on ISRE.

ISRE 2021. Given the difficulties and uncertainties, planning the 2021 conference has been fraught. The board is currently discussing moving the conference to 2022 – also to avoid too much overlap with other conferences that have been pushed back already.

ISRE website. You all know that our website does not live up well to its task. Build on a platform that was outdated when the website was created too many years ago, it has become unusable. In the next weeks we will launch a new website, hosted by a professional provider, which will allow us to have again a common place to meet at. Members will soon receive an email with all the relevant information.

The Journal. Emotion Review is doing very well. We had some problems earlier in the year when one of the EIC encountered health problems that proved more persistent than hoped for. But we are now in line for things to get back to normal. Next year, the journal will go online only. A choice that is both practical and sustainable.

Your President,
Ursula

References

Hess, U. (2003). *Emotion at work*. Burgundy Reports, CIRANO.

Scherer, Klaus R. "Wider die Vernachlässigung der Emotion in der Psychologie." In *Bericht über den 32. Kongress der Deutschen Gesellschaft für Psychologie in Zürich*, vol. 1, pp. 304-317. 1980.

ISRE Early Career Researchers Section

ISRE Early Career Researchers Section: Update on Initiatives

Tanja S. H. Wingenbach, Melina West, Soohyun Lee, Claire Ashley, Manuel F. Gonzalez, Zhixin Pu

The International Society for Research on Emotion - Early Career Researchers Section (ISRE ECRS) is a platform within ISRE for emotion/affective science researchers from any field, discipline, method, or culture. The ISRE ECRS organizes introductory meetings (i.e., professional and social) for early career emotion researchers, both during ISRE conferences and between meetings. Additionally, the ISRE ECRS strives to create and maintain member support through awards, career development opportunities, expert feedback, webinars, and more.

The ISRE ECRS continues to grow since its launch in 2013, and has implemented several initiatives for early career emotion researchers. In 2020, the ISRE ECRS is launching the second rounds of both its mentoring program and its webinar series.

Mentoring Program

The mentoring programme brings together early career emotion researchers and established emotion researchers. The previous programme took place in 2018 and was largely a success, with one mentee winning an Emerging Scholar Research Award in their discipline as the result of a project they undertook with their mentor. In this year's instalment, set to launch this month (April 2020), we improved the programme using suggestions from the previous participants. For instance, the 2020 mentoring programme involves a longer and more structured mentoring period, from April to September. The programme also spans a range of topics and goals. For instance, goals include provision of general career advice, sharing of data, project collaborations, etc., and topics include emotion recognition, regulation, expression, emotion theory, measurement, and many more.

We wish to recognize our dedicated mentors for this year (listed in alphabetical order):

Assistant Professor Lauren Bylsma, University of Pittsburgh

Professor Joseph Campos (co-founder and first president of ISRE), University of California, Berkeley

Professor Yochi Cohen-Charash, Baruch College, City University of New York

Professor Guido Gendolla, University of Geneva

Associate Professor Eva Krumhuber, University College London

Professor Terry Maroney, Vanderbilt University

Affiliate Professor Ed Tan, University of Copenhagen

Associate Professor Eric Walle, University of California, Merced

Webinar Series

Our webinar series aims at engaging ISRE members during the year that no conference takes place. The inaugural webinar series in 2018 included talks by experienced emotion researchers on a range of emotion topics. This time around, each speaker will address the same theme in their talk: "The contribution of your field to emotion science in the past and future". Webinars will consist of 30-45 minutes of speaker presentation, and 15-30 minutes of Questions & Answers and discussion session with the audience.

Webinars will be advertised soon, so keep an eye out for further information on the ISRE Listserv and social media outlets!

The whole team is excited to implement initiatives that align with the interests of ISRE and support early career emotion researchers. We would also like to thank ISRE for its support in implementing these initiatives, the publishers that have supported our initiatives financially, the senior researchers who have participated in our initiatives, and the early career researchers who have been part of our journey thus far.

Would you like to volunteer within the ISRE ECRS?

If you are an ISRE Associate Member[1] and keen to get involved, please get in touch. We are excited for you to help us best support our emotion research community.

Our upcoming initiatives include the webinar series and a mentoring program. Please note that a volunteer commitment should be at least 1 year and requires continuous involvement. Should you be interested in playing an active role in the ISRE ECRS, please contact Tan by email (tanja.wingenbach@bath.edu). In your interest email, include a short bio, a statement of which initiative you prefer to get involved with, and why.

Are you an early career emotion scientist or faculty that support early career emotion scientists? Join our Facebook page: **https://www.facebook.com/groups/ISRE.JRS/ ?ref=br_rs**

For any other questions or comments, please email Claire Ashley (claire.ayako@gmail.com)

Current ISRE ECRS Board

Chair: Tanja S. H. Wingenbach (Postdoctoral Senior Research Fellow, University of Zurich/University Hospital Zurich, Switzerland)

As Chair, Tanja coordinates and initiates activities, liaises with the ISRE president/board, serves as a spokesperson of the ECRS, and represents the ECRS within the ISRE board.

Secretary: Claire A. Ashley, (M.Sc., Cognitive Retrainer, Park Terrace Care Center, USA)

In her role as secretary, Claire is responsible for internal and external communications (i.e. communicates with the membership, e.g. through Facebook, the ISRE mailing list) and liaising with the ISRE conference organisers.

Events Coordinator: Melina West (Postdoctoral Researcher, University of Connecticut, USA)

As Events Coordinator, Melina is responsible for planning and overseeing special events, e.g., webinar series, social events, coaching, workshops.

Poster Award Coordinator: Soohyun (Ashley) Lee (PhD candidate, Baruch College & The Graduate Center, City University of New York, USA)

Ashley is responsible for managing the poster awards at the ISRE conference (e.g., contacting ISRE board, communicating with jury members, call for submissions).

---

[1] ISRE Associate Membership is defined as: "less-established emotion researchers who have not yet obtained the terminal degree in their field or are engaged in postgraduate training. Associate Members are typically advanced graduate students or postdoctoral students."

Additional volunteers:
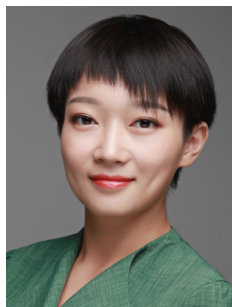
Zhixin Giselle Pu (M.A. student, University of Wisconsin-Milwaukee, USA)

Manuel F. Gonzalez (PhD Candidate, Baruch College & The Graduate Center, City University of New York, USA)

ISRE Spotlight

A Socio-cultural 'Fit' Perspective on Emotions

Jozefien De Leersnyder, PhD

Center for Social and Cultural Psychology
KU Leuven
jozefien.deleersnyder@kuleuven.be

The same situation is often experienced differently by people from different socio-cultural backgrounds, and these emotional mismatches often bear negative consequences. For instance, when my Turkish Belgian friend Ayşe told me that her boss had broken his promise to grant her and her teammates a tenured contract, I thought she should be angry, stand up for herself and go argue with her boss – a pattern of emotion that was very much shared by her Belgian teammates and that reflected our concern with autonomy, fairness and individual rights. However, Ayşe herself did not feel that way: She also felt angry, for sure, but in addition she also felt ashamed (maybe she had fallen short?) and still experienced a lot of respect and closeness towards her boss – a pattern of emotion that prevented her from arguing with him and reflected her concern for their (hierarchic) relationship. Upon finding out how she felt, Ayşe's Belgian teammates found her 'weak' and did not ask her to join for lunch the next couple of days, which, in turn, triggered Ayşe to doubt herself. As illustrated here, emotional mismatches in everyday situations may not only hamper people's social interactions, but may also – when occurring repeatedly – impact their well-being and thriving in a society.

Over the past ten years, I have addressed several research questions that relate to the example of Ayşe and that, together, aim to understand the interplay between culture, emotion and well-being. Firstly, and building on the comprehensive evidence that there are systematic cultural differences in emotional experience (e.g., Mesquita, 2003; Mesquita, De Leersnyder, & Boiger, 2016; Tsai & Clobert, 2019), I investigated *if the emotional patterns of immigrant minorities can change upon repeated exposure to and engagement in the majority context* and thus, if Ayşe's emotions would *acculturate*. Secondly, and extrapolating from the literature on emotional similarity in relationships and teams (e.g., Anderson, Keltner, & John, 2003; Gonzaga, Campos & Bradbury, 2007; Totterdell, 2000), I explored *if people would benefit from being emotionally similar to others in their cultural context* and thus, if Ayşe's (repeated) experiences of emotional (mis)fit would be associated with her relational and psychological well-being. Most recently, I started tapping into the question *how emotional fit may come about in intercultural interactions,* thereby addressing i) *if* the increased salience of typically Belgian cultural concerns (e.g., the concern for autonomy) shapes Ayşe's emotional patterns, and ii) *how* she might learn new emotional patterns through observing, mimicking and negotiating them with her Belgian teammates. Together, these research lines provide evidence for the socio-cultural shaping of emotional experience, and put forward a contextual and dynamic socio-cultural fit perspective on emotion.

Below, I describe each of these three research lines in more detail, after which I will highlight how they provide more general insights for emotion researchers. Yet first, I will spend a few words on how I understand emotional experience from a cultural psychological perspective (see also De Leersnyder, Boiger, & Mesquita, 2020).

Emotions as Acts of Making Meaning

Among emotion scholars, there is quite some consensus that emotions i) occur when something is relevant to our concerns – i.e., the values, goals and needs that are salient at a particular moment in time (Frankfurt, 1980; Frijda, 1986), and ii) reflect how people evaluate a particular situation (appraisal) and how they aim to act upon it (action tendency). For instance, 'anger' is usually considered to reflect that someone else is to be blamed for a negative outcome (i.e., appraisal) to something you care about (i.e., concern), as well as characterized by an urge to (re-)gain control, influence and correct the other's behavior (i.e., action tendency; Frijda, Kuipers, & Schure, 1989; Stein, Trabasso, & Liwag, 1993). Likewise, 'shame' is usually characterized by an appraisal

of the situation as if you fell short with respect to social norms you aim to adhere to, as well as by an action tendency to restore social relationships (e.g., Keltner, & Buswell, 1997). As such, emotional experiences can be considered as acts of making meaning: They not only signal *what* people find important, but also reflect *which stances* they take in (these usually social) situations and relationships (Mesquita, 2010; Solomon, 2004).[1]

Nevertheless, there is a fairly heated debate among emotion scholars about the extent to which emotions are culturally shaped. Yet, from the above sketched definition of emotions as acts of making meaning, it may be clear *why* we would expect to find evidence for the latter option. If there is substantial cultural variation in the things people find important (i.e., their values, moral concerns; e.g., Schwartz, 1992), as well as in the stances they usually take in situations and relationships (i.e., their models of self and relating; e.g., Markus & Kitayama, 1991), then the 'core ingredients' of emotional experience are 'cultured'. Consequentially, we may expect *systematic cultural variation* in emotional experience that can be understood from both the importance of specific cultural concerns and the typical ways of being and relating.

Over the past two decades, evidence for this cultural alignment of emotions has accumulated (for reviews, see De Leersnyder, Boiger & Mesquita, 2020; Mesquita, 2003; Tsai & Clobert, 2019). Specifically, so-called autonomy-promoting (or disengaging) emotions like 'anger' that highlight a person's independence and separateness from others, seem to be more intense when people perceive a situation to touch upon self-focused concerns, such as those for success and showing your ambition (De Leersnyder, Kuppens, Koval & Mesquita, 2017). In contrast, so-called relatedness-promoting (or engaging) emotions like 'shame' that highlight a person's interdependence and connectedness with others, seem to be more intense when people perceive a situation to touch upon other-focused concerns,

Professor Jozefien De Leersnyder

such as those for helping others and being loyal (De Leersnyder et al., 2017). Thus, as there is cultural variation in the importance of these concerns, the frequencies and intensities with which people experience certain types of emotion may differ accordingly. Indeed, it has been found that autonomy-promoting emotions like 'anger' are more prevalent in Western European and North American middle class contexts that emphasize autonomy and success and that define a good person as being independent, autonomous and standing up for oneself (e.g., Boiger, Mesquita, Uchida, & Feldman Barrett, 2013; Kitayama, Mesquita, & Karasawa, 2006). In contrast, relatedness-promoting emotions like 'shame' are more prevalent in many East Asian, Mediterranean and working-class contexts that emphasize community and connectedness and that define a good person as being interdependent, related and respecting / maintaining hierarchy and harmony (e.g., Boiger et al., 2013; Kitayama et al., 2006). Hence, the frequencies and intensities with which people experience emotions can be understood from differences in both their cultural concerns and typical ways of being and relating.

---

[1] I denote discrete emotion terms like 'anger' with quotation marks because I consider them to refer to a *population* of feelings that includes different varieties of feelings characterized by slightly different sets of appraisals and action tendencies, experienced in slightly different types of situations that we still, somehow, came to label by the same word because that is what people in our socio-cultural communities tend to do as well (e.g., Barrett, 2017; Boiger et al., 2018; De Leersnyder, 2019; Parkinson, 2019).

Taken together, a definition of emotions as (collaborative) acts of making meaning in and upon the world, helps us understand why there is cultural variation in emotional experience. This, in turn, sets the scene for my research on emotional acculturation and emotional fit with context, which I'll describe below.

Can Emotional Patterns Change Upon Engaging in Another Cultural Context?

In a first research line, I address if and how people's patterns of emotion – i.e., the patterns of intensities with which they experience a set of emotions in response to a particular situation – change upon engaging in another cultural context. In other words, I study if there is *emotional acculturation*.[2]

There are two prerequisites to study emotional acculturation, though. First, there needs to be cultural variation in emotional experience to begin with and hence different cultural contexts need to be characterized by different emotional patterns. Second, people engaging in the *same* cultural context need to be more likely to experience similar patterns of emotion than people engaging in *different* socio-cultural contexts. As outlined above, the literature provides extensive support for the first prerequisite; one of our own studies yielded support for the second one. Specifically, in that study (reported in De Leersnyder, 2014) we administered the Emotional Patterns Questionnaire (EPQ; De Leersnyder, Mesquita, & Kim, 2011) among majority members of European American, Korean, Belgian and Turkish cultural groups. Based on these data, we then calculated average emotional patterns for each cultural group*type of situation. By means of profile correlations we finally established each individual participant's level of *emotional fit* with both their *own* and *another* cultural group's average emotional pattern for the corresponding situation (see Methods Box for the full procedure). Across all four samples, we found that participants' fit with their *own* culture's average patterns of emotion

was higher than their fit with *another* culture's average patterns (De Leersnyder, 2014). People engaging in the same cultural context are thus more likely to experience similar patterns of emotion, which fulfills the second prerequisite to study emotional acculturation.

Turning to the actual study of emotional acculturation, we have conducted several studies that made use of the EPQ and method outlined above to establish participants' emotional fit with the respective majority group. The first two studies included Korean American and Turkish Belgian minority adults as well as their majority counterparts (De Leersnyder et al., 2011, Study 1, 2 and 2a); the third one included a large, representative sample of minority and majority youth in Belgium (Jasini, De Leersnyder, Phalet, & Mesquita, 2019). All three studies provided evidence for emotional acculturation. Specifically, we found that minorities' levels of emotional fit with the majority were significantly higher if they i) belonged to a later generation (i.e., second, third) than to the first generation; ii) had spent more years in the majority culture; iii) had migrated at a younger age and iv) reported more daily social contacts with majority members. Together, these studies suggest that although different upon arrival in a novel cultural context, immigrant minorities' patterns of emotional experience may become similar to those of the majority upon engaging with them.

Some recent extensions of the nationally representative study on minority youth in Belgium (led by Dr. Jasini) further illuminate this association between social contact and emotional fit. A first extension moves beyond minorities' self-reported contact with majority members by operationalizing it as bidirectional intercultural friendship ties in social networks embedded in classrooms. These data revealed that minority youths' levels of emotional fit were higher if their social networks counted more bidirectional friendship ties with majority members and if more majority members nominated them as their friend (Jasini, et al., submitted).

---

[2] Although acculturation may affect all of us who engage in diverse socio-cultural contexts and thereby engage in sustained first-hand-contact with another culture (see Redfield, Linton & Herskovits, 1936), I mainly study this process in immigrant minorities

because it may be most relevant and most detectable among them. Of course, majority members may undergo emotional acculturation as well given enough sustained contact with members from (immigrant) minority groups.

Method's Box.
Emotional Patterns Questionnaire (EPQ).

Step 1: Report on emotional situation

Instruction:
Sometimes, people find themselves in situations that make them **feel A for/about B** (for example, feel X,Y,Z).

Please think about an occasion **at/with C** in which you felt **A for/about B** (for example, X,Y,Z).

Please describe the situation briefly. Provide as much detail as needed for somebody to understand why you felt that way in this situation.

A = good vs. bad (= Valence dimension)
B = for yourself vs. about your relationships with others
        (= Social engagement dimensions)
C= at school/work vs. at home/with family vs. with friends
        (= Social-context dimension)
X,Y,Z = example emotion terms that match with
        valence*social engagement (
    ➔   2x2x3 design = 12 possible types of situations

Step 2: Emotional pattern

Instruction:
Please think about the situation you just described. To what extent did you feel each of the following emotions?

	Not at all		A bit			Extremely	
	1	2	3	4	5	6	7
angry							
ashamed							
happy							
proud							
respectful							
etc. (total= 15-30 emotions)							

Calculate emotional fit:

1. **Establish structural equivalence** of emotion items across samples one wishes to compare
2. **Calculate average pattern** of emotion across all majority members in sample for each type of situation
3. **Correlate** each participants' pattern to the average cultural pattern, given a certain type of situation by means of **profile correlations.** When doing so for majority members: remove own scores from average.
4. **Transform** the correlations into linear variable by means of **Fischer transformation.**

See De Leersnyder, Mesquita, & Kim, 2011 for a full explanation of the procedure.

A second extension moves beyond the above-reported cross-sectional inferences by collecting two more waves of data, each with one year apart. Cross-lagged as well as growth-curve analyses yielded that i) minority youth who reported more social interactions with majority peers had higher levels of emotional fit the subsequent year and ii) minorities' levels of emotional fit in one year positively predicted their number of majority friends the next year (Jasini, De Leersnyder, Phalet & Mesquita, in preparation). Thus, although social contact may be driving emotional change, there is a positive feedback loop between emotional fit and social contact over time.

Similar evidence for the impact of social contact on emotional fit was found in two studies that explored to what extent minorities *maintain* their typical heritage emotional patterns. Specifically, we calculated to what extent our Korean American and Turkish Belgian participants fit with the average patterns of their respective *heritage* cultural context as comprised by responses of monocultural Koreans and Turks (De Leersnyder, Kim & Mesquita, 2020). We found that immigrant minorities' emotional fit with their heritage culture was lower than that of heritage members themselves, but at a roughly equal level as their majority culture fit (which is in sharp contrast to monoculturals who mostly fit their own culture average patterns; cfr. supra). Moreover, it was higher if they reported to spend more time with heritage culture friends and if they interacted in heritage culture settings such as their home. Combined, these findings suggest that minorities' heritage emotional patterns can be maintained through heritage cultural friendships and are not overwritten by the newly acquired emotional patterns; minorities may simply experience different patterns of emotion depending on their context of interaction (with home vs. school contexts reflecting heritage vs. majority cultures, respectively).

In sum, this line of research thus established first evidence for the idea that Ayşe's emotional patterns may acculturate. Upon being exposed to the Belgian cultural context and having more social interactions with Belgian majority members – and especially with majorities who consider her as a friend – Ayşe's patterns of emotion may, over time, come to be more similar to those of her Belgian teammates. Yet, as she

interacts with Turkish friends, Ayşe may also maintain emotional fit to her Turkish heritage cultural patterns – patterns that are activated most when she's engaging in heritage culture settings, such as at home. Emotional acculturation may thus be a bi-dimensional process that not only is driven by cultural engagement and social contact, but that is also context dependent.

Is Cultural Fit in Emotions Rewarding?

There is clear evidence of emotional acculturation. Yet, is it also beneficial to undergo changes in one's emotional patterns such that one comes to fit in emotionally? For roommates, romantic couples and teammates this seems to be the case. For instance, higher emotional similarity among roommates is associated with higher closeness, trust, and likelihood to remain friends (Anderson, et al., 2003); among romantic couples, is it is associated with higher relationship satisfaction and a better quality of the relationship itself (e.g. Anderson et al., 2003; Gonzaga, et al., 2007). And, emotionally fitting teams and groups not only tend to be closer, happier and more identified than more divergent groups (e.g., Delvaux, Meeussen & Mesquita, 2015), but are also characterized by improved cooperation and decreased conflict (Barsade, 2002). Therefore, we may expect that *emotional fit with one's culture* bears positive consequences as well: interaction partners may respond more positively to one another when there is emotional similarity (Szczurek, Monin, & Gross, 2013), which may lower their stress during the interaction (Townsend, Kim, & Mesquita, 2014) and increase mutual understanding and cooperation (Fisher & Manstead, 2016). In the long-run, these repeated positive interpersonal interactions that also instigate experiences of 'feeling right', may translate into both higher relational (i.e., satisfaction with relationships) and psychological well-being (i.e., lower depression).

To test this hypothesis, we conducted a series of studies that linked majority members' fit with their *own* culture's normative patterns of emotion to their levels of well-being (De Leersnyder, Kim, & Mesquita, 2015; De Leersnyder, Mesquita, Kim, Eom, & Choi, 2014). We focused on European American, Korean and Belgian cultural contexts as they differ profoundly in their cultural

models of self and relating, allowing us to test whether associations would be similar or different across cultural contexts. To capture emotional fit, we again administered the EPQ and followed the procedure outlined above to calculate participants' fit with the typical patterns of their own culture; to capture well-being, we administered the World Health Organization's Quality of Life Scale that taps into both relational and psychological well-being and has been validated across many cultural contexts (Skevington, Lotfy, & O'connell, 2004).

When predicting relational well-being, we found similar results across the three samples: well-being was higher to the extent that participants fitted better with their own culture's normative patterns of emotion in *relationship-focused* (i.e., socially engaging) situations (De Leersnyder et al., 2014). When predicting psychological well-being, we found a consistent, yet culturally varying pattern of results: well-being was higher to the extent that participants fit better with their own culture's normative patterns of emotion in *those situations that afford the realization of the cultural model of self and relating* (De Leersnyder et al., 2015). Specifically, European Americans' psychological well-being was higher upon fitting in with autonomy-promoting (i.e. disengaging) situations at work – situations that primarily afford (both positive and negative) autonomy-promoting emotions such as pride and anger, and that, thereby, afford the realization of the European American cultural mandate to be autonomous, independent, successful and unique, especially at work (e.g., Kitayama & Imada, 2010; Sanchez-Burks, Uhlmann, & Carlyle, 2013). In contrast, Koreans' psychological well-being was higher upon fitting in with relatedness-promoting (i.e. engaging) situations at home only – situations that primarily afford (both positive and negative) relatedness-promoting emotions such as closeness and shame and that, thereby afford the Korean cultural mandate of being closely related to family members (Markus & Kitayama, 1991; Neuliep, 2011; Rothbaum et al., 2000). Finally, Belgians' psychological well-being was higher upon fitting in with both autonomy-promoting and relatedness-promoting situations, regardless of the valence of the situation or the context – a finding that can be interpreted as being in line

with the Belgian cultural model of egalitarian autonomy in which autonomy is valued as long as it does not jeopardize relatedness (e.g., Boiger, De Deyne, & Mesquita, 2013). Thus, experiencing emotional fit with culture in situations that are about relationships is linked to higher satisfaction with one's social relationships, while experiencing cultural fit in situations that are culturally central is linked to better psychological well-being.

In sum, evidence among monoculturals shows that emotional fit with culture may be beneficial. Future studies should explore whether similar patterns of results hold among immigrant minorities like Ayşe, testing if increases in her emotional fit with the majority lead her to experience smoother social relationships with Belgians, as well as higher levels of self-esteem and lower levels of depression (see Consedine, Chentsova-Dutton, & Krivoshekova, 2014 for a first study predicting immigrant women's somatic health from their fit with the majority ways to *express* emotion). Yet, since Ayşe does not only navigate Belgian majority contexts (e.g., at work) but also Turkish heritage contexts (e.g., at home) throughout her daily life, we may expect that her well-being is not only contingent upon her emotional fit with typical Belgian emotional patterns in majority contexts, but also upon her emotional fit with typical Turkish emotional patterns in heritage contexts.

How Does Emotional Fit Come About?

In my most recent line of research, I have started to tap into the question of how emotional fit may come about in intercultural interactions, thereby focusing on both the processes that activate *existing* emotional patterns and on the processes that instigate the internalization of *new* emotional patterns. Related to the first type of processes, I investigated if biculturals would experience *different* patterns of emotion given the exact *same* situation, depending on which concerns are most salient in their specific cultural context. If concerns indeed constitute the backdrop against which we make meaning (cfr. supra), and if different cultural contexts are characterized by different concerns, then these could activate different ways of making sense of the same situation and hence activate different patterns of emotional experience.

Specifically, I conducted a field experiment with Turkish Belgian biculturals for whom it is likely that they had internalized both the typical Belgian and Turkish patterns of emotion (De Leersnyder & Mesquita, submitted). I randomly assigned them to either a Belgian cultural context (i.e., neighborhood center where language of interaction and interaction partners were Flemish-Belgian) or a Turkish cultural context (i.e., room attached to neighborhood mosque where language of interaction and interaction partners were Turkish). In either context, participants interacted with a same-gender confederate who enacted extensively pre-tested scenarios that could be interpreted as either clear-cut violations of autonomy (i.c., fairness, equal rights) or community (i.c., respect, hierarchy) concerns, or as ambiguous violations that could be equally well interpreted as a violation of autonomy or community concerns. Building on the literature, I expected that clear-cut situations would be associated with culturally similar patterns of emotion, with autonomy violations being characterized by 'anger' and community violations being characterized by 'contempt' (Rozin et al., 1999). In addition, and building upon the idea that Belgian contexts highlight autonomy concerns more than community concerns whereas the opposite is true for Turkish contexts (Shweder, Munch, Mahapatra, & Park, 1997), I expected that *ambiguous* situations would be interpreted in line with the most salient concerns and hence, be characterized by different patterns of emotion in the Belgian versus Turkish context.

All interactions were video-taped and the 2-minute intervals after each violation were coded for biculturals' behavioral cues of 'anger' and 'contempt' by a multicultural team of three hypotheses-blind coders according to a scheme that included both FACS and SPAFF codes (Ekman & Friesen, 1978; Gottman, McCoy, Coan, & Collier, 1996). The results largely confirmed my expectations: Biculturals' emotional responses to clear-cut violations were in line with the finding by Rozin and colleagues (autonomy = 'anger' > 'contempt'; community = 'contempt' ≥ 'anger'), while their responses to ambiguous violations yielded different emotional patterns that were in line with the contexts' most salient concerns. In the Belgian context,

biculturals' emotional responses were dominated by 'anger' cues – a pattern of emotion that mirrored the one found in the clear-cut autonomy violations. In contrast, in the Turkish context, biculturals responded with equal 'anger' and 'contempt' upon ambiguous situations – a pattern that was clearly different from the one obtained in Belgian contexts and that was more in line with their responses upon clear-cut community violations (De Leersnyder & Mesquita, submitted). Therefore, the current experiment suggests that cultural differences in the salience of (autonomy vs. community) concerns may guide biculturals' interpretations of (ambiguous) situations and, therefore, yield different patterns of emotion.

Applying the above-described findings to emotional acculturation yields three novel insights. Firstly, if emotions are systematically linked to concerns, we may come to understand emotional acculturation as a shift in people's concerns and thus in the backdrop against which they make meaning of everyday situations. Secondly, if different cultural contexts promote different concerns, minorities may experience heritage versus majority emotional patterns (and fit) depending on their socio-cultural context of interaction and the concerns that are most salient within that context. Finally, if we aim to understand *how* immigrant minorities come to acquire new emotional patterns in social interactions with majority peers, we may want to focus on processes that reflect the negotiation of meanings.

This brings me to the second part of this research question: what are the exact micro-processes that instigate emotional fit in intercultural interactions, and that may, over time, account for enduring changes in emotional patterns and thus for emotional acculturation? Do immigrant minorities acquire new emotional patterns by simply observing emotional reactions of Belgian majority members? Or do immigrant minorities need to mimic majority members' emotional patterns before they can come to internalize these new patterns? Or does internalization require an even more active negotiation of emotional meanings, such as in the process of *grounding* through which people establish (new) common ground with one another (see De Leersnyder, Mirzada, Neo & Dinç, 2020 for a first study on this, and Kashima, Klein &

Clark, 2007 for a theoretical explanation of the grounding process). Currently, we are in the final stages of collecting data to shed light on how each one of these micro-processes may instigate emotional fit in intercultural interactions.

In sum, this research line points to the possibility that Ayşe may learn new emotional patterns through observing, mimicking and negotiating emotional meanings with her Belgian teammates and friends. Through these processes, both her heritage and new emotional patterns may come to co-exist and once internalized, Ayşe may switch between them depending on whether she interacts in Belgian versus Turkish cultural contexts that promote different types of concerns, which constitute the backdrop against which she makes meaning.

Insights for Emotion Researchers and Future Directions

The results of these three research lines not only shed light on the phenomenon of emotional acculturation, but also bear several insights for emotion psychology more generally. Firstly, our findings point to a systematic co-occurrence of emotions and concerns in both monoculturals (De Leersnyder et al., 2017) and biculturals (De Leersnyder & Mesquita, submitted). This co-occurrence challenges the negligible role that most emotion theories assign to concerns. In fact, although concerns are considered crucial to emotion elicitation – an emotion cannot be elicited without a situation relevant to one's concerns – it is tacitly assumed that concerns are *mutually interchangeable* to the nature of the emotional experience – that is, that the *content* of the concern does not matter for *which* emotion we experience (e.g., Frijda, 1986; Scherer, 2005). For instance, in order to experience 'anger' most emotion theories propose that the situation has to be relevant to one's concerns (i.e., appraisal of goal relevance) but do not specify *which* type of concern should be relevant (e.g., autonomy/self-focused vs. community/other-focused concerns?), thereby neglecting the content of the concern (i.e., *what* the person cares about). The current findings argue for a different perspective in which the content of concerns *does* importantly shape experience: They show how (culturally) salient concerns constitute the backdrop against which people make meaning during emotional episodes.

Hence, "different cultural contexts may encourage certain themes [– i.e., goals, concerns –] over others [and may, therefore…] give rise to systematic cultural variation in emotional experience" (Kitayama et al., 2006, p. 890). This novel perspective on the role of concerns not only triggers novel endeavors into the processes that link concerns to emotions (e.g., via the activation of certain sets of appraisals or action tendencies; see De Leersnyder et al., 2017), but also highlights once more that emotions are, at their core, acts of making meaning.

Secondly, studying emotional change during the process of acculturation can be seen as a naturally occurring quasi-experiment testing whether changes in cultural contexts bring about changes in emotional patterns. Our finding, then, that people's emotional patterns change upon engaging in a new/other socio-cultural context, challenges the idea that the links between antecedent events and (distinct) emotions are either hardwired through evolution (e.g., Ekman, 1992) or carved in stone during childhood. Rather, it suggests that there is plasticity in people's emotional life long after initial socialization. *When* people experience *which* emotions is continuously shaped by their (changing) cultural engagements. In this way, the study of emotional acculturation may contribute to the long-standing debate on the role of culture in emotion.

Thirdly, our findings lend further empirical support to a socio-dynamic perspective on emotions (e.g., Boiger & Mesquita, 2012; Mesquita & Boiger, 2014), arguing that emotions emerge from social interactions such that "social interaction and emotions form one system of which the parts cannot be separated" (Mesquita & Boiger, p. 1). Specifically, our finding that (repeated) social contact and friendships are driving changes in emotional patterns highlight that social interactions are inherently shaped by culture and may, therefore, embody reinforcement structures and affordances that systematically promote or constrain the experience of certain emotions over others. Hence, our social interactions may instigate different emotional patterns and it is thus during social interactions that (new) patterns of emotional experience are (re)calibrated to (new) cultural standards, whether this occurs through observation, mimicking or

grounding. Relatedly, our initial evidence for the co-existence and context-dependency of heritage and majority emotional patterns in biculturals suggests that one's social context of interaction may shape/activate one's patterns of emotional experience. Once acquired, emotional patterns are thus not omnipresent, but activated by people's specific contexts of interaction. Together, these findings hint at not only the *emergent* nature of emotions, but also at their *dynamism*.

Fourthly, our methodological innovation to capture people's *emotional fit with culture* allows for another perspective on cultural differences in emotion: away from mean score differences *between* cultural groups and toward modeling *variability* in adherence to (descriptive) cultural norms among people *within* the same cultural group. Indeed, people are not carbon copies of their culture's prototypical member and operationalizing individual differences as such may do more justice to (implicit) theoretical perspectives in cultural psychology (Chentsova, De Leersnyder, & Senzaki, forthcoming). In addition, this cultural fit approach to emotion may provide a more nuanced understanding of the potential benefits of experiencing certain emotions over others. Rather than that certain emotions *per se* are (cross-culturally) associated with psychological and relational well-being, it may be that well-being is linked to one's socio-cultural *fit* in emotional experience for specific (culturally central) types of situations. Indeed, experiencing culturally normative emotions may promote acceptance and belonging as it helps one be the type of person and engage in relationships that are valued in one's cultural context. Hence, emotions and emotional acculturation can be considered gateways into (minority) belonging and well-being.

Finally, and despite the insights put forward above, I wish to mention how the study of emotional acculturation is only in its infancy. Future research should, for instance, focus on acculturation in other aspects of emotional functioning than people's self-reported experience; one example is a study by Consedine, Chentsova-Dutton & Krivoshekova (2014) on acculturation in minority women's emotional expressivity, another is a study by Bjornsdottir and Rule (2016) on the acculturation of minorities' ability to

understand emotions from the 'reading the mind in the eyes-task'. Future work could also explore the specific *content* of acculturative changes in emotion. To date, we don't know if acculturation affects specific (sets) of emotion(s) only or if it affects emotional patterning as a whole. Similarly, we can only guess if higher well-being is linked to acculturation in specific (sets) of emotion(s) or to acculturation in the co-occurrence and/or patterning of emotion. Moreover, and as outlined above, we have only begun to study the specific mechanisms underlying emotional change. Future studies should thus continue to investigate *how* people's emotional systems get recalibrated during close, and meaningful (intercultural) interactions.

Acknowledgements

References

Anderson, C., Keltner, D., & John, O. P. (2003). Emotional convergence between people over time. *Journal of Personality and Social Psychology, 84*, 1054-1068.

Barrett, L. F. (2017). *How emotions are made.* Boston, MA: Houghton Mifflin Harcourt.

Barsade, S. G. (2002). The ripple effect: Emotional contagion and its influence on group behavior. *Administrative Science Quarterly, 47*, 644-675.

Bjornsdottir, R. T., & Rule, N. O., (2016). On the relationship between acculturation and intercultural understanding: Insight from the Reading the Mind in the Eyes test. *International Journal of Intercultural Relations, 52,* 39-48.

Boiger, M., Ceulemans, E., De Leersnyder, J., Uchida, Y., Norasakkunkit, V., & Mesquita, B. (2018). Beyond Essentialism: Cultural Differences in Emotions Revisited. *Emotion, 18(8),* 1142-1162. doi: 10.1037/emo0000390.

Boiger, M., De Deyne, S., & Mesquita, B. (2013). Emotions in "the world": Cultural practices, products, and meanings of anger and shame in two individualist cultures. *Frontiers in Psychology 4(867).*

Boiger, M., & Mesquita, B. (2012). The construction of emotion in interactions, relationships, and cultures. *Emotion Review, 4,* 221-229.

Boiger, M., Mesquita, B., Uchida, Y., & Barrett, L. F. (2013). Condoned or condemned: The situational affordance of anger and shame in Japan and the US. *Personality and Social Psychology Bulletin, 39,* 540–553.

Chentsova-Dutton, Y. E., De Leersnyder J., & Senzaki, S., (forthcoming). The Psychology of Cultural Fit: Introduction to the Research Topic. *Frontiers in Psychology.*

Consedine, N.S., Chentsova-Dutton, Y. E. & Krivoshekova, Y. S. (2014). Emotional acculturation predicts better somatic health: Experiental and expressive acculturation among immigrant women from four ethnic groups. *Journal of Social Clinical Psychology, 33(10),* 867–889.

De Leersnyder, J. (2014). *Emotional Acculturation.* Doctoral dissertation. KU Leuven, Belgium.

De Leersnyder, J., (2019). Emotional Enculturation and Acculturation: Insights from Culture and Emotion Research for Affective Social Learning. In D. Dukes & F. Clement (Eds.),

Affective Social Learning. Cambridge, UK: Cambridge University Press.

De Leersnyder, J., Kim, H., & Mesquita, B. (2015). Feeling right is feeling good: Psychological well-being and emotional fit with culture in autonomy-vs. relatedness-promoting situations. *Frontiers in Psychology, 6: 630.*

De Leersnyder, J., Kim, H., & Mesquita, B. (2020). *My emotions belong here and there: Extending the phenomenon of emotional acculturation to heritage cultural contexts.* Manuscript under review.

De Leersnyder, J., Koval, P., Kuppens, P., & Mesquita, B. (2017). Emotions and concerns: Situational evidence for their systematic co-occurrence. *Emotion, 18(4),* 597-614.

De Leersnyder, J., Boiger, B. & Mesquita, B. (2020). What has culture got to do with emotions? A lot! In M. Gelfand, Y-Y. Hong and C.H. Chui. (Eds.), *Advances in Cultural Psychology* (Vol. 8). Oxford: Oxford University Press.

De Leersnyder, J., & Mesquita, B. (submitted). *Emotional Frame-switching: How biculturals' make their emotions fit the cultural context.* Manuscript submitted for publication.

De Leersnyder, J., Mesquita, B., & Kim, H. (2011). Where do my emotions belong? A study of immigrants' emotional acculturation. *Personality and Social Psychology Bulletin. 37(4),* 451-463.

De Leersnyder, J., Mesquita, B., Kim, H., Eom, K., & Choi (2014). Emotional Fit with Culture: A Predictor of Individual Differences in Relational Well-being. *Emotion, 14(2),* 241-245.

De Leersnyder, J., Mirzada, F., Neo, S., & Dinç, G. (2020). *Grounding emotions in intercultural interactions: a social experiment on the negotiation of emotional meaning.* Manuscript in preparation.

Delvaux E, Meeussen L and Mesquita B (2015) Feel like you belong: on the bidirectional link between emotional fit and group identification in task groups. *Frontiers in Psychology 6:1106.* doi: 10.3389/fpsyg.2015.01106

Ekman, P. (1992). An argument for Basic Emotions. *Cognition and Emotion 6 (3),* 169-200.

Ekman, P. & Friesen, W. (1978) *Facial Action Coding System: A Technique for the Measurement of Facial Movement.* Consulting Psychologists Press, Palo Alto.

Fischer, A. H., & Manstead, A. S. R. (2016). Social functions of emotion and emotion regulation. In L. F. Barrett, M. Lewis, & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (4th ed., pp. 424–439). New York, NY: Guilford Press.

Frankfurt, H. G. (1988). *The importance of what we care about.* New York, NY: Cambridge University Press.

Frijda, N. H. (1986). *The emotions.* Cambridge: Cambridge University Press.

Gottman, J. M., McCoy, K., Coan, J., & Collier, H. (1996). The Specific Affect Coding System (SPAFF). In J.M. Gottman (Ed.), *What Predicts Divorce: The Measures.* New York, NJ: Lawrence Erlbaum Associates.

Jasini, A., De Leersnyder, J., Kende, J. Gagliolo, M., Phalet, K., & Mesquita, B. (submitted). *Emotional Acculturation in the classroom: a social network study.* Manuscript submitted for publication.

Jasini, A., De Leersnyder, J., Phalet, K., & Mesquita, B. (2019). Tuning in emotionally: Associations of cultural exposure with distal and proximal emotional fit in acculturating youth. *European Journal of Social Psychology, 49, 352–365.*

Jasini, A., De Leersnyder, J., Phalet, K., & Mesquita, B. (in preparation). *Emotional acculturation: A three year longitudinal study on minority youth in Flanders.* Manuscript in preparation.

Keltner, D., & Buswell, B. N. (1997). Embarrassment: Its distinct form and appeasement functions. *Psychological Bulletin, 122,* 250–270. doi:10.1037/0033-2909.122.3.250

Kitayama, S., & Imada, T. (2010). Implicit independence and interdependence: A cultural task analysis. In B. Mesquita, L. F. Barrett, & E. R. Smith (Eds.), *The mind in context* (pp. 174-200). New York, NY: Guilford.

Kitayama, S., Mesquita, B., & Karasawa, M. (2006). The emotional basis of independent and interdependent selves: Socially disengaging and engaging emotions in the US

and Japan. *Journal of Personality and Social Psychology, 91(5),* 890-903.

Kashima, Y., Klein, O., & Clark, A.E. (2007). Grounding: Sharing Information in Social Interaction. In K. Fiedler (Ed), *Social Communication* (pp. 27-78). Psychology Press.

Lazarus, R. S. (1991). *Emotion and adaptation.* New York: Oxford University Press.

Markus, H. R., & Kitayama, S. (1991). Culture and self: Implications for cognition, emotion, and motivation. *Psychological Review 98,* 224–253.

Mesquita, B. (2003). Emotions as dynamic cultural phenomena. In R. Davidson, H. Goldsmith, & K. R. Scherer (Eds.), *The handbook of the affective sciences* (pp. 871-890). New York: Oxford University Press.

Mesquita, B. (2010). Emoting: A contextualized process. In Mesquita, B., Barrett, L. F., Smith, E.R. (Eds.). *The Mind in Context* (pp.83-104). New York: Guilford Press.

Mesquita, B., & Boiger, M. (2014). Emotions in Context: A Sociodynamic Model of Emotions. *Emotion Review, 6(4),* 298–302. https://doi.org/10.1177/1754073914534480.

Mesquita, B., De Leersnyder, J., & Boiger, M. (2016). The cultural psychology of emotion. In L. F. Barrett, M. Lewis, & J. Haviland-Jones (Eds.), *Handbook of emotions* (4th ed., pp. 493–511). New York, NY: Guilford Press.

Neuliep, J. W. (2011). *Intercultural Communication: A Contextual Approach* (5th Ed.). Thousand Oaks, CA: Sage.

Parkinson, B. (2019). *Heart to heart. How your emotions affect other people.* Cambridge, UK: Cambridge University Press.

Redfield, R., Linton, R. & Herkovits, M. (1936). Memorandum for the study of acculturation. *American anthropologist, 38*, 149-152

Rothbaum, F. M., Pott, M., Azuma, H., Miyake, K., & Weisz, J. R. (2000). The development of close relationships in Japan and the United States: Paths of symbiotic harmony and generative tension. *Child Development*, *71*(5), 1121–1142.

Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology, 76*, 574−586.

Sanchez-Burks, J. & Uhlmann, E.L. (2014). Outlier nation: the cultural psychology of American workways. In Masaki Yuki & Marilynn Brewer (Eds.), *Culture and group processes* (pp. 121-142). Oxford, United Kingdom: Oxford University Press.

Scherer, K.R. (2005). What are emotions? And how can they be measured? *Social Science Information, vol. 44 (4)*, 695-729.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1-65). Orlando, FL: Academic Press.

Shweder, R. (1991). *Thinking through Cultures: Expeditions in Cultural Psychology.* Cambridge, MA: Harvard University Press.

Shweder, R. A., Much, N. C., Mahapatra, M., & Park, L. (1997). The "big three" of morality (autonomy, community, and divinity), and the "big three" explanations of suffering. In A. Brandt & P. Rozin (Eds.), *Morality and health* (pp. 119–169). New York, NY: Routledge.

Skevington, S. M., Lotfy, M., & O'Connell, K. A. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group. *Quality of Life Research, 13,* 299–310

Solomon, R. C. (2004). *Thinking About Feeling: Contemporary Philosophers on Emotions.* Oxford University Press.

Szczurek, L., Monin, B., & Gross, J. J. (2012). The *Stranger* Effect : The Rejection of Affective Deviants. *Psychological Science, 23,* 1105-1111.

Totterdell, P. (2000). Catching moods and hitting runs. *Journal of Applied Psychology, 85*, 848-859.

Townsend, S., Kim, H., & Mesquita, B. (2014). Are you feeling what I'm feeling? Emotional similarity buffers stress. *Social Psychology and Personality Science*, *5(5),* 526-533. doi 10.1177/1948550613511499.

Tsai, J.L. & Clobert, M. (2019). Cultural influences on emotion: Empirical patterns and emerging trends. In S. Kitayama & D. Cohen (Eds). *Handbook of Cultural Psychology.* Oxford University Press.

Feature article: Emotion & Evolution

Tacit Creationism in Emotion Research

Randolph M. Nesse

The Center for Evolution and Medicine
Arizona State University

Abstract

Recent quantitative studies have advanced emotions research substantially, but they have done little to resolve enduring large-scale controversies. This article suggests that tacit creationism is at the root of the problem. Envisioning emotions as aspects of a designed machine encourages searching for answers of a kind that do not exist. The quest for the Holy Grail of agreement on the number, nature, and functions of emotions is futile because the emotions are aspects of organically complex systems whose structures and functions are radically different from those of machines. A fully evolutionary foundation for emotions research discourages hopes for simple elegant models but it can nonetheless advance research by dispelling misconceptions and suggesting new questions.

Introduction

Substantial recent progress in understanding emotions has done little to resolve fundamental issues (Ekman & Davidson, 1994a; Fox, 2018; Griffiths, 1997). Despite general agreement that some emotions are universal (Ekman, 2016), debates continue about whether emotions are better viewed as discrete states or positions on dimensions. Their adaptive significance remains unclear (Lench, 2018; Oatley & Jenkins, 1992; Roseman & Steele, 2018). The significance of cross-cultural variations remains uncertain (Barrett, 2013; Lindquist et al., 2013). Even the question of what emotions are is still unsettled (Adolphs & Andler, 2018; Griffiths, 1997; Scherer, 2005). These could simply be good questions that need more work. However, the lack of consensus after decades of work by hundreds of capable scientists suggests the possibility that some of these questions have no answers of the sort we have been seeking.

This article argues that progress in emotions research has been slowed by tacit creationism. By tacit creationism I mean viewing organisms as if they are products of design, without attributing the design to a deity. Few scientists attribute the characteristics of organisms to a supernatural power, but many nonetheless view organisms as if they were designed machines. Organisms are, however, different from machines in several crucial ways.

Machines serve specific purposes envisioned by the designer, while bodies are shaped by natural selection to maximize gene transmission. A machine has one normal structure defined by blueprints, but there is no single normal DNA code or normal phenotype for a species. Machines are manufactured by a process that aims to make identical copies, but the development of organisms is inherently stochastic, so even genetically identical individuals will vary. Machines have distinct parts that serve specific functions, but most parts of a body serve multiple functions, and many functions, such as combating infection, are distributed among many parts. Failure of one part of a machine is likely to cause malfunction unless the design includes a backup system. Failure of a single gene or other aspect of a body may not result in general malfunction because the parts of organic systems are intermeshed in ways that makes them inherently robust. Finally, the complexity of machines can be described by defining their parts and their connections. The complexity of organisms is qualitatively different, with indistinct parts whose myriad causal connections frustrate attempts to frame simple elegant descriptions. Table 1 summarizes these differences between machines and organisms.

Viewing bodies as machines fosters major misconceptions across biology and medicine. For instance, students learn the Krebs cycle and the clotting cascade as diagrams of simple causal connections between separate boxes, ignoring the organic complexity of multiple molecules interacting with multiple others. They learn the hypothalamic pituitary adrenal system in isolation from its many connection to other

endocrine and neuronal systems. Neuroanatomy courses often attribute specific functions to specific structures. For instance, the hippocampus is often described as the seat of memory, but it also has other functions and the memory network involves many other loci.

Such simplifications are necessary. Describing all of the connections of a molecule or all the functions of a component frustrates the mission of science to simplify, and the need to teach content that can be remembered and tested. Ignoring the organic complexity of evolved systems nonetheless distorts understanding and fosters misconceptions.

Tacit creationism in emotions research is especially problematic. It encourages misconceptions that have fueled decades of controversy about questions that do not have answers of the kind we have looked for. Six such misconceptions each deserve separate consideration (see Table 2).

The Structure of the Emotions

No starting point for scientific studies of emotions could be more natural than trying to describe and classify them. The resulting effort has generated vast data and hundreds of articles that represent real progress compared to the pure philosophizing of previous centuries (Davidson et al., 2009; Ekman, 2016). However, noting that consensus is lacking would be a vast understatement. Locating different emotions in a space defined by dimensions, usually starting with valence and intensity, is an enterprise that
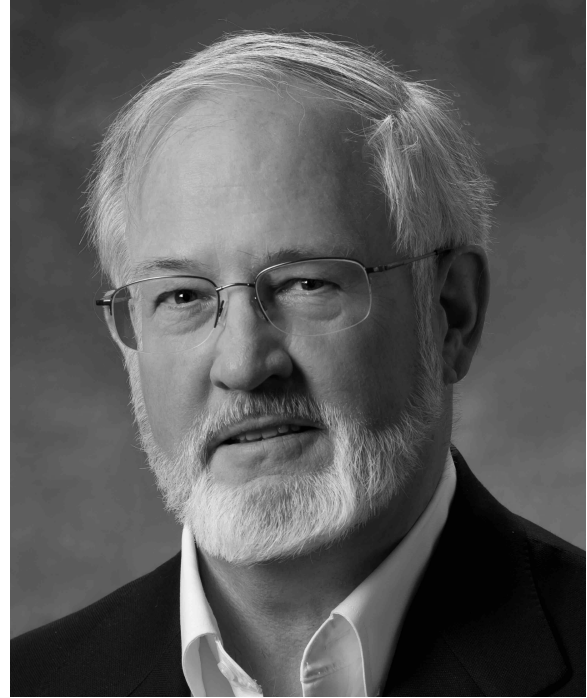
Professor Randolph Nesse

continues, with ever more elegant proposals (Fontaine et al., 2007). This approach has been overshadowed, however, by attempts to specify a few basic emotions and their relationships to derivative emotions (Ekman, 1992). What seemed to be agreement on six primary emotions (happiness, sadness, fear, anger, surprise and disgust) has been challenged by proposals that four suffice (collapsing fear with surprise, and anger with disgust) (Jack et al., 2014), that eight are necessary in four pairs (Plutchik, 1970), or

Table 1: Seven Differences Between Machines and Organisms

MACHINES	ORGANISMS
Blueprints define the ideal type	Genes vary, so no ideal type exists
Are manufactured in a process that is designed to create identical products	Develop in a process with intrinsic stochasticity, despite canalization
Discrete components each serve specific functions envisioned by the designer	Intermeshed subunits serve multiple overlapping functions
Information processing systems have distinct input, processing and output modules	Information processing systems have indistinct intermeshed components
Serve specific functions envisioned by an engineer	Are shaped by natural selection to maximize gene transmission
Failure of a part causes system malfunction unless a backup system is part of the design	Mutations and damage may not cause malfunction because the networks structure of organically complex systems makes them inherently robust
Even extreme complexity remains describable in terms of specific connections among defined components	Components with nonspecific boundaries and myriad connections make organic systems complex in ways that are difficult to comprehend or describe.

Table 2: Tacit Creationism vs. an Evolutionary View of Emotions

Tacit creationist view	Evolutionary view
Emotions can be understood as discrete entities or locations in a dimensional space	Emotions are overlapping suites of responses that evolved from precursor emotions that gave selective advantages in certain situations.
Each emotion has a specific function	Each emotion serves multiple functions and specific functions are served by multiple emotions
Negative emotions are harmful and often pathological	Negative emotions are as useful as positive emotions
The components of an emotion should generally be expressed concordantly	Different aspects of an emotion may be expressed to different degrees depending on the situation
Consistent mechanisms that mediate emotions should make emotion patterns the same for different individuals	Variations in genes and environment create substantial individual variation in emotion patterns and regulation
Emotions benefit individuals	Emotions maximize gene transmission, often at a cost to individual health and welfare

that two, or seven or 13 are needed. To make sense of this diversity, some articles emphasize growing agreement that several emotions are universal (Ekman, 2016). A more explicitly evolutionary view considers emotions as specialized states that evolved from related ancestral states so their boundaries and exact number cannot be readily specified (Nesse, 1990; Nesse & Ellsworth, 2009), and the basic 6 emotions capture under 20% of the total variety of emotions (Keltner, 2019). Hope that specific neural correlates will define specific emotions or dimensions turns out to be unfounded (Dubois & Adolphs, 2015; Skerry & Saxe, 2015).

Thinking about emotions as if they were products of design encourages searching for a specific number of emotions with distinct boundaries and specific functions, as if they were parts of a machine. However, because emotions are products of natural selection, we should instead expect many states with indistinct boundaries and multiple functions. The desire for a simple taxonomy of emotions is deep, but such proposals necessarily provide a false sharpening that distorts our view. The system is not only more complex than we would like it to be, it is organically complex in ways that make it difficult to describe.

Closely related is the difficulty in answering the fundamental question: what are emotions? Though it is the topic of innumerable articles and many books (Ekman & Davidson, 1994a; Fox, 2018; Griffiths, 1997; Izard, 2010), the question remains unanswered (Adolphs & Andler, 2018). Adding an evolutionary framework provides a way forward by shifting the question instead to

ask how emotions came to exist (Nesse, 1990; Tooby, & Cosmides, 1990). In this perspective, emotions are special states shaped by natural selection that give selective advantages when expressed in situations where they have given fitness advantages over evolutionary time. This view avoids controversies about whether they are natural kinds (Barrett, 2006). Emotions are biological traits, but they are not essentialized, universal, distinct entities with specific boundaries and functions. Instead, as illustrated by Figure 1, they evolved from other emotion precursors and therefore have overlapping boundaries and functions (Nesse, 2004). While there is moderate consistency across members of a species, variations between individuals are expected as a result of differences in genes, experiences and culture.

In summary, the quest for a simple taxonomy of emotions has been like the search for the Holy Grail. The object of the search does not exist, at least not in the simple form we have hoped to find. Accepting the reality that emotions are organically complex states shaped by natural selection requires revisiting the data with different ideas about what we expect to find. Recent efforts to use new available brain, facial expression, video and appraisal data to create a consensus taxonomy of 20 to 25 emotions offer a route that may transcend past difficulties if they acknowledge the organic complexity of the emotions (Keltner, 2019).

The Functions of Emotions

Attention to function traces a great arc of progress in emotions research. Neglect of the

Figure 1. A Phylogeny of Emotions (Nesse, 2004).

functions of emotions early in the 20th century was supplanted by a variety of related approaches to their adaptive significance (Ekman & Davidson, 1994b; Frijda, 1994; Izard, 1992; Izard & Ackerman, 2000; Keltner & Haidt, 1999; Oatley & Jenkins, 1992). Machine parts have specific functions, so it seems sensible to seek specific functions for specific emotions. However, because they are products of natural selection, each emotion has multiple functions, including adjusting physiology, signaling, cognition and behavior. This integrated perspective grew with the rise of evolutionary approaches to behavior in the late 20th century that shifted the focus to how emotions give a selective advantage (Al-Shawaf et al., 2016; (Campos et al., 2006); Evans, 2002; Gilbert, 2015; Keltner & Gross, 1999; Nesse, 1990, 2009; Nesse & Ellsworth, 2009; Plutchik, 1970; Tooby & Cosmides, 1990, 2008; Tracey, 2014). This framework makes it possible to differentiate emotions in terms of their functions of adjusting multiple aspects of the individual in ways that increase the ability to cope with the threats and opportunities present in a situation.

This focus on situations has major implications for the structure of emotions. Similarities and differences between emotions arise from the similarities and differences of situations that have recurred over evolutionary time. This provides a framework for explaining why different emotions have central tendencies but blurry overlapping boundaries. In this view, different emotions are nothing like different species of animals; they are more like different styles of music with suites of associated characteristics. Blues, jazz, and rock and roll evolved from each other and continue to influence each other. They have clear prototypes, but uncertain histories and blurry boundaries that spur arguments among musicologists akin to debates among emotions researchers.

The functions of negative emotions have been neglected, and for understandable reasons (Harris, 2018; Ketelaar, 1995). Anxiety, sadness, anger and depression may seem useless or harmful, a conclusion that seems to be confirmed by evidence that proneness to negative emotions is associated with worse health and relationships. However, the disadvantages of being on the end of the spectrum with strong tendencies to experience negative emotions says nothing about the adaptive significance of the capacity for experiencing negative emotions in general. Individuals with a deficient experience of negative emotions may experience even greater disadvantages that are covert because they do not give rise to complaints and requests for treatment (Nesse, 2019a).

The illusion that negative emotions are useless is created because they are usually aroused by disadvantageous situations and because they are often expressed excessively or unnecessarily. This is a result of the 'smoke detector principle' (Nesse, 2005). In the face of uncertainty, the costs of expressing an inexpensive response may be far less than the costs of failing to respond if a threat is actually present, so false alarms and excessive responses are expected and normal.

Recognition of the utility of negative emotions is growing steadily across the range of emotions research, bringing new research opportunities (Nesse, 2019a). The value of anxiety is widely recognized, although data demonstrating its utility are limited (Stein & Nesse, 2015). Despite extensive behavioral ecological studies that demonstrate the value of adjusting patterns of effort depending on risks and the availability of rewards, the value of low mood remains contentious (Gilbert, 1992; Hagen, 2011; Nettle, 2004; Wakefield et al., 2017). Studies of anger and other social emotions bring in game theory to help explain unpredictability (Haselton & Ketelaar, 2006; Ketelaar, 2004; Skyrms, 1996). Expanding the study of utility to all negative emotions will provide an important missing foundation for dealing with the painful clinical conditions they give rise to.

The Consistency of Emotions and their Expression

Viewing organisms as machines creates an expectation that emotions should be consistent across individuals, consistent across cultures, and that all aspects of an emotion should be expressed concordantly. An evolutionary view challenges all three expectations.

Individuals differ genetically, so their emotion mechanisms will differ. The high heritability and extraordinary variation of emotion expression intensity, from alexithymia to the extremes of borderline personality, provides an illustration (Eley & Plomin, 1997). Differences in life experience also influence an individual's emotion regulation mechanisms. Evolved mechanisms may adjust responses to certain stimuli adaptively, for instance, lack of care early in life increases stress responses (Meaney, 2010). Traumatic experiences may damage normal mechanisms, but it remains uncertain if this damage results from an adaptive adjustment pushed beyond its bounds, or an entirely different mechanism (Cantor, 2009).

Moreover, emotions are different in different cultures (Kitayama & Markus, 1994). Genetic differences are possible but physical and social environment variations are certain to result in emotion variations. Some will turn out to be products of random variation, a few may represent the output of evolved mechanisms that detect aspects of the environment and shift responses accordingly and adaptively, such as the stress response becoming more sensitive when the early environment is harsh (Meaney, 2010).

Different environments also give rise to different situations with different adaptive challenges. For instance, tendencies to intense striving for status may yield increased resources in technological societies but arouse social attacks in hunter gatherer cultures (Boehm, 1999). In response to differences in situations encountered, the various overlapping aspects of an emotion response will tend to be organized differently in different cultures (Barrett, 2014). Furthermore, and separate, are differences in tendencies to describe patterns of emotions with different boundaries and different words (Wierzbicka, 1999).

Appraisal theory avoids many difficulties by focusing on situations and the several kinds of decisions that must be made well to maximize adaptation (Ellsworth & Scherer, 2003; Roseman,

2013; Smith & Ellsworth, 1985). It helps in the analysis of cultural variation in emotions (Mesquita & Ellsworth, 2001; Scherer, 1997) and allows consideration of how the meaning of a situation may vary depending on an individual's goals. That the effect of life events depends substantially on the individual's life goals has been convincingly demonstrated (Diener & Fujita, 1995), but such research has been hard to extend, perhaps because it is very difficult to identify idiographic goals and link them to nomothetic responses. An evolutionary approach that systematically analyzes a person's resources, desires, strategies and expectations may help to provide a nomothetic framework that can incorporate idiographic data (Nesse, 2019b).

Concordant expression is expected for the components of a special mode of operation of a machine. When the automatic transmission of a car is shifted from "sport" to "eco-mode" a variety of adjustments are made synchronously and consistently every time. The expectation that aspects of emotion should also be coordinated is reflected in the description of other patterns as "desynchronized" (van Duinen et al., 2010). Such desynchronized patterns of expression are well-documented for physiological responses, but they are especially dramatic when conscious experience of an emotion is absent despite other indicators that an emotion is present (Clore & Ketelaar, 1997; Nisbett & Wilson, 1977; Winkielman & Berridge, 2004). While the very idea of an emotion presupposes moderate consistency of response, there are several reasons to expect that the physiological, behavioral and subjective aspects of an emotion will not necessarily be consistently coordinated.

Some variations in coordination of emotion expression arise from genetic variations and other stochastic factors. More interesting is the possibility that some arise from mechanisms shaped to adjust patterns of expression depending on the details of the situation. This has been suggested in specific form for symptoms of depression that turn out to be very different depending on whether the precipitant is a social loss or a failure. Social losses arouse social pain, crying and desire for support, while failed efforts arouse guild, rumination, pessimism and fatigue (Keller & Nesse, 2005). More work is needed to assess the hypothesis that such variations are products of an adaptation.

Cui Bono?

Machines are designed to serve functions that benefit their designers and users. Cars are designed for transportation, telescopes for viewing objects at a distance, and saws for cutting. Some machines, such as computers, have multiple functions, but those functions are nonetheless in the service of the user. The generally-justified expectation is that machines are designed to maximize their utility and trouble-free functioning.

The parallel expectation, that natural selection shapes organisms to maximize health, welfare and longevity, is widespread but incorrect. Most genetic variations that increase health and longevity will also increase Darwinian fitness; that is why bodies usually function remarkably well for an extended period. These benefits are, however, wonderful side-effects of selection for maximizing gene transmission (Nesse & Williams, 1994). Genetic tendencies that increase reproduction are selected for even if they compromise health.

The three-fold higher mortality rates for young men compared to young women in modern societies is a dramatic example (Kruger & Nesse, 2004). Selection for male competitive drive and ability at the expense of risk avoidance and capacities for tissue healing is typical in species where males compete for mates. In species where females choose mates, males are often burdened with extraordinarily costly traits, such as peacock tails (Cronin, 1991). Occasionally, costly useless traits show up in machines for similar reasons—Cadillac models from 1959 to 1969 sported huge fins with no purpose other than appearance and status display. The inordinate status striving that characterizes many human lives is similar.

Analysis of human emotions that benefit gene transmission at a cost to the individual offer major opportunities for research to better understand when emotions are best suppressed because they benefit our genes at a cost to us (Chisholm, 1999; Nesse, 2019a; Sterelny & Griffiths, 1999). The cognitive distortions aroused by romantic passion often result in rueful retrospective wisdom. Intense status striving often seems to benefit potential reproduction at a great cost to individual

happiness. And the joy people experience on news of their children's success, and the pain on hearing news of their troubles, benefits their shared genes.

Conclusion

Thinking about bodies and minds as designed machines is natural, but it reflects a tacit creationism that fosters major misconceptions that obstruct progress in emotions research. These misconceptions are not universal among emotions researchers, and they are fading as evolutionary perspectives are coming to be accepted as essential. However, embracing a fully evolutionary view of emotions will not be fast or easy. We especially love science when it provides simple generalizations that explain otherwise complex phenomena, for instance, the laws of gravity. Simple principles can make prediction and control possible. Discovering an underlying simple reality can also arouse pleasure and awe. Confronting the organically complex reality of biological systems can arouse very different responses. One that has been prevalent in emotions research is to persist in trying to describe the system as if it were a simple product of design. The result is frustration and controversy as different schemas compete without a clear way to adjudicate their claims. The other response is to acknowledge that organically complex systems do not have the kinds of simple structures and functions we crave. This arouses disappointment (Nesse, 2014). However, it also can relieve the frustration of looking for what does not exist, and it can open up opportunities to ask new questions with new kinds of answers.

Acknowledgements

References

Adolphs, R., & Andler, D. (2018). Author Reply: We Don't Yet Know What Emotions Are (But Need to Develop the Methods to Find Out). *Emotion Review*, *10*(3), 233–236. doi: 10.1177/1754073918772092

Al-Shawaf, L., Conroy-Beam, D., Asao, K., & Buss, D. M. (2016). Human Emotions: An Evolutionary Psychological Perspective. *Emotion Review*, *8*(2), 173–186. doi: 10.1177/1754073914565518

Barrett, L. F. (2006). Are emotions natural kinds? *Perspectives on Psychological Science*, *1*(1), 28–58.

Barrett, L. F. (2013). Psychological construction: The Darwinian approach to the science of emotion. *Emotion Review*, *5*(4), 379–389.

Barrett, L. F. (2014). The Conceptual Act Theory: A Précis. *Emotion Review*, *6*(4), 292–297. doi: 10.1177/1754073914534479

Boehm, C. (1999). *Hierarchy in the Forest: The Evolution of Egalitarian Behavior*. Harvard University Press.

Campos, J. J., Thein, S., & Owen, D. (2006). A Darwinian Legacy to Understanding Human Infancy: Emotional Expressions as Behavior Regulators. *Annals of the New York Academy of Sciences*, *1000*(1), 110–134. doi: 10.1196/annals.1280.040

Cantor, C. (2009). Post-Traumatic Stress Disorder: Evolutionary Perspectives. *Australian & New Zealand Journal of Psychiatry*, *43*(11), 1038–1048. doi: 10.3109/00048670903270407

Chisholm, J. S. (1999). *Death, hope and sex: Steps to an evolutionary ecology of mind and morality*. Cambridge University Press.

Clore, G., & Ketelaar, T. (1997). Minding our emotions: On the role of automatic, unconscious affect. In *The automaticity of everyday life: Advances in social cognition* (Vol. 10, pp. 105–120). Lawrence Erlbaum Associates, Inc.

Cronin, H. (1991). *The Ant and the Peacock: Altruism and Sexual Selection from Darwin to Today*. Cambridge University Press.

Davidson, R. J., Scherer, K. R., & Goldsmith, H. H. (Eds.). (2009). *Handbook of affective sciences*. Oxford University Press.

Diener, E., & Fujita, F. (1995). Resources, personal strivings, and subjective well-being: A nomothetic and idiographic approach. *Journal of Personality and Social Psychology*, *68*(5), 926–935. doi: 10.1037/0022-3514.68.5.926

Dubois, J., & Adolphs, R. (2015). Neuropsychology: How Many Emotions Are There? *Current Biology*, *25*(15), R669–R672. doi: 10.1016/j.cub.2015.06.037

Ekman, P. (1992). Are there basic emotions? *Psychological Review*, *99*(3), 550–553.

Ekman, Paul. (2016). What Scientists Who Study Emotion Agree About. *Perspectives on Psychological Science*, *11*(1), 31–34. doi: 10.1177/1745691615596992

Ekman, Paul, & Davidson, R. J. (Eds.). (1994a). *The nature of emotion: Fundamental questions*. Oxford University Press.

Ekman, Paul, & Davidson, R. J. (Eds.). (1994b). What is the function of emotions? In *The nature of emotion: Fundamental questions* (pp. 97–136). Oxford University Press.

Eley, T. C., & Plomin, R. (1997). Genetic analyses of emotionality. *Current Opinion in Neurobiology*, *7*(2), 279–284. doi: 10.1016/S0959-4388(97)80017-7

Ellsworth, P. C., & Scherer, K. R. (2003). Appraisal processes in emotion. In *Handbook of affective sciences* (pp. 572–595). Oxford University Press.

Evans, D. M. (2002). *Emotion: The Science of Sentiment*. Oxford University Press.

Fontaine, J. R., Scherer, K. R., Roesch, E. B., & Ellsworth, P. C. (2007). The world of emotions is not two-dimensional. *Psychological Science*, *18*(12), 1050–1057.

Fox, A. S. (Ed.). (2018). *The nature of emotion: Fundamental questions* (Second edition). Oxford University Press.

Frijda, N. H. (1994). Varieties of affect: Emotions and episodes, moods and sentiments. In Paul Ekman & R. J. Davidson (Eds.), *The Nature of Emotion* (pp. 59–67). Oxford University Press.

Gilbert, P. (1992). *Depression: The Evolution of Powerlessness*. Guilford.

Gilbert, P. (2015). An Evolutionary Approach to Emotion in Mental Health With a Focus on Affiliative Emotions. *Emotion Review*, *7*(3), 230–237. doi: 10.1177/1754073915576552

Griffiths, P. (1997). *What emotions really are: The problem of psychological categories*. University of Chicago Press.

Hagen, E. H. (2011). Evolutionary theories of depression: A critical review. *The Canadian Journal of Psychiatry*, *56*(12), 716–726.

Harris, C. R. (2018). Understudied Negative Emotions: What They Can Tell Us About the Nature of Emotions. *Emotion Review*, *10*(4), 269–271. doi: 10.1177/1754073918801177

Haselton, M. G., & Ketelaar, T. (2006). Irrational emotions or emotional wisdom? The evolutionary psychology of affect and social behavior. *Affect in Social Thinking and Behavior*, *8*, 21.

Izard, C. E. (1992). Basic emotions, relations among emotions, and emotion-cognition relations. *Psychological Review*, *99*(3), 561–565.

Izard, C. E. (2010). The Many Meanings/Aspects of Emotion: Definitions, Functions, Activation, and Regulation. *Emotion Review*, *2*(4), 363–370. doi: 10.1177/1754073910374661

Izard, C. E., & Ackerman, B. P. (2000). Motivational, organizational, and regulatory functions of discrete emotions. *Handbook of Emotions*, *2*, 253–264.

Jack, R. E., Garrod, O. G. B., & Schyns, P. G. (2014). Dynamic Facial Expressions of Emotion Transmit an Evolving Hierarchy of Signals over Time. *Current Biology*, *24*(2), 187–192. doi: 10.1016/j.cub.2013.11.064

Keller, M. C., & Nesse, R. M. (2005). Is low mood an adaptation? Evidence for subtypes with symptoms that match precipitants. *Journal of Affective Disorders*, *86*(1), 27–35.

Keltner, D. (2019). Toward a consensual taxonomy of emotions. *Cognition and Emotion*, *33*(1), 14–19. doi: 10.1080/02699931.2019.1574397

Keltner, D., & Gross, J. J. (1999). Functional accounts of emotions. *Cognition & Emotion*, *13*(5), 467–480.

Keltner, D., & Haidt, J. (1999). Social Functions of Emotions at Four Levels of Analysis. *Cognition & Emotion*, *13*(5), 505–521.

Ketelaar, T. (1995). Emotions as mental representations of gains and losses: Translating prospect theory into positive and negative affect. *Meeting of the American Psychological Society, New York, NY*.

Ketelaar, T. (2004). Ancestral emotions, current decisions: Using evolutionary game theory to explore the role of emotions in decision making. In C. B. Crawford & C. Salmon (Eds.), *Evolutionary Psychology, Public Policy and Personal Decisions*. Lawrence Erlbaum.

Kitayama, S., & Markus, H. R. (Eds.). (1994). *Emotion and culture: Empirical studies of*

mutual influence. American Psychological Association. doi: 10.1037/10152-000

Kruger, D. J., & Nesse, R. M. (2004). Sexual selection and the male: Female mortality ratio. *Evolutionary Psychology*, *2*, 66–85.

Lench, H. C. (Ed.). (2018). *The function of emotions: When and why emotions help us*. Springer Science+Business Media.

Lindquist, K. A., Siegel, E. H., Quigley, K. S., & Barrett, L. F. (2013). The hundred-year emotion war: Are emotions natural kinds or psychological constructions? Comment on Lench, Flores, and Bench (2011). *Psychological Bulletin*, *139*(1), 255–263. doi: 10.1037/a0029038

Meaney, M. J. (2010). Epigenetics and the biological definition of gene× environment interactions. *Child Development*, *81*(1), 41–79.

Mesquita, B., & Ellsworth, P. C. (2001). The Role of Culture in Appraisal. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal Processes in Emotion: Theory, Methods, Research* (pp. 233–248). Oxford University Press.

Nesse, R. M. (1990). Evolutionary explanations of emotions. *Human Nature*, *1*(3), 261–289.

Nesse, R. M. (2004). Natural selection and the elusiveness of happiness. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *359*(1449), 1333–1347. doi: 10.1098/rstb.2004.1511

Nesse, R. M. (2005). Natural selection and the regulation of defenses: A signal detection analysis of the smoke detector principle. *Evolution & Human Behavior*, *26*(1), 88–105.

Nesse, R. M. (2009). Evolutionary origins and functions of the emotions. In D. Sander & K. R. Scherer (Eds.), *The Oxford companion to emotion and the affective sciences* (pp. 158–164). Oxford University Press.

Nesse, R. M. (2014). Comment: A General "Theory of Emotion" Is Neither Necessary nor Possible. *Emotion Review*, *6*(4), 320–322. doi: 10.1177/1754073914534497

Nesse, R. M. (2019a). *Good Reasons for Bad Feelings: Insights from the Frontier of Evolutionary Psychiatry*. Dutton Books.

Nesse, R. M. (2019b). How to Understand an Individual Human Being. In *Good Reasons for Bad Feelings: Insights from the Frontier of Evolutionary Psychiatry* (pp. 141–159). Dutton Books.

Nesse, R. M., & Ellsworth, P. C. (2009). Evolution, emotions, and emotional disorders. *American Psychologist*, *64*(2), 129–139. doi: 10.1037/a0013503

Nesse, R. M., & Williams, G. C. (1994). *Why We Get Sick: The New Science of Darwinian Medicine*. Vintage Books.

Nettle, D. (2004). Evolutionary origins of depression: A review and reformulation. *Journal of Affective Disorders*, *81*(2), 91–102. doi: 10.1016/j.jad.2003.08.009

Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, *35*(4), 250.

Oatley, K., & Jenkins, J. M. (1992). Human Emotions: Function and Dysfunction. *Annual Review of Psychology*, *43*(1), 55–85. doi: 10.1146/annurev.ps.43.020192.000415

Plutchik, R. (1970). Emotions, Evolution, And Adaptive Processes. In *Feelings and Emotions* (pp. 3–24). Elsevier. doi: 10.1016/B978-0-12-063550-4.50007-3

Roseman, I. J. (2013). Appraisal in the Emotion System: Coherence in Strategies for Coping. *Emotion Review*, *5*(2), 141–149. doi: 10.1177/1754073912469591

Roseman, I. J., & Steele, A. K. (2018). Concluding Commentary: Schadenfreude, Gluckschmerz, Jealousy, and Hate—What (and When, and Why) Are the Emotions? *Emotion Review*, *10*(4), 327–340. doi: 10.1177/1754073918798089

Scherer, K. R. (1997). The Role of Culture in Emotion-Antecedent Appraisal. *Journal of Personality and Social Psychology*, *73*, 902–922.

Scherer, Klaus R. (2005). What are emotions? And how can they be measured? *Social Science Information*, *44*(4), 695–729. doi: 10.1177/0539018405058216

Skerry, A. E., & Saxe, R. (2015). Neural Representations of Emotion Are Organized around Abstract Event Features. *Current Biology*, *25*(15), 1945–1954. doi: 10.1016/j.cub.2015.06.009

Skyrms, B. (1996). *Evolution of the social contract*. Cambridge University Press.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, *48*(4), 813.

Stein, D. J., & Nesse, R. M. (2015). Normal and Abnormal Anxiety in the Age of DSM-5 and ICD-11. *Emotion Review*, *7*(3), 223–229. doi: 10.1177/1754073915575407

Sterelny, K., & Griffiths, P. E. (1999). *Sex and death: An introduction to philosophy of biology*. University of Chicago Press.

Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology*, *11*(4–5), 375–424.

Tooby, J., & Cosmides, L. (2008). The evolutionary psychology of the emotions and their relationship to internal regulatory variables. In *Handbook of emotions, 3rd ed.* (pp. 114–137). Guilford Press.

Tracey, J. (2014). An Evolutionary Approach to Understanding Distinct Emotions. *Emotion Review*, in press.

van Duinen, M., Schruers, K., & Griez, E. (2010). Desynchrony of fear in phobic exposure. *Journal of Psychopharmacology*, *24*(5), 695–699. doi: 10.1177/0269881108098821

Wakefield, J. C., Lorenzo-Luaces, L., & Lee, J. J. (2017). Taking People as They Are: Evolutionary Psychopathology, Uncomplicated Depression, and Distinction between Normal and Disordered Sadness. In *The Evolution of Psychopathology* (pp. 37–72). Springer, Cham. doi: 10.1007/978-3-319-60576-0_2

Wierzbicka, A. (1999). *Emotions across languages and cultures: Diversity and universals* (2405036). Cambridge University Press.

Winkielman, P., & Berridge, K. C. (2004). Unconscious Emotion. *Current Directions in Psychological Science*, *13*(3), 120–123.

Feature article: Emotion & Evolution

Sexual Disgust: An Evolutionary Perspective

Courtney L. Crosby
David M. Buss[1]

Department of Psychology
University of Texas at Austin

Introduction

One of the first emotions explored by Charles Darwin, *disgust*, presumably evolved to solve adaptive problems related to our health. Examples of these problems include avoiding ingesting toxic or pathogenic substances, such as rotting meat or moldy mushrooms. However, a key scientific question is whether disgust evolved to solve adaptive challenges in addition to food consumption. Darwin described disgust as a revulsion to offensive objects, primarily those of taste, but extended to anything that causes extreme dislike or distaste—through vision, smell, or touch (Darwin, 1872). While avoiding contaminated food is a key adaptive problem that our human ancestors faced, they also had to avoid having sex with individuals that could harm their survival, their children's survival, or more generally their reproductive success. *Sexual disgust* may have evolved as a somewhat specialized emotion—based on the underlying architecture of disgust—to solve these problems (Tybur, Lieberman, & Griskevicius, 2009).

Adaptive Problems Sexual Disgust is Hypothesized to Solve

If sexual disgust is an evolved emotion, what adaptive problems might it have evolved to solve? We have recently developed evolutionarily informed speculations about these problems that await empirical testing. We identified six core dimensions of sexual disgust: (1) Hygiene, (2) Oral sex, (3) Promiscuity, (4) Same-sex attraction, (5) BDSM, and (6) Taboo

(Crosby, Durkee, Meston, & Buss, 2020). Each dimension represents partially distinct subcomponents of sexual disgust that, together, provide more nuanced insight into the complexity of human sexual behavior. Sexual disgust towards the behaviors subsumed by these six factors represents hypothesized solutions to somewhat distinct adaptive problems that our ancestors faced within the realm of sexuality (see Table 1 for the full list of items grouped by factor).

Critical adaptive problems include pathogen transmission, incest avoidance, harm avoidance, reputational damage, and the loss of valuable resources or mates. For example, increased risk of pathogen transmission is an important adaptive problem that individuals face when engaging in sex. A single French kiss, for example, can transmit as many as 80 million bacteria from one person's mouth to the other's (Kort, Caspers, van de Graaf, van Egmond, Keijser, & Roeselers, 2014). Although most of these bacteria are harmless, pathogen transmission can lead to a variety of harmful health issues, such as sexually transmitted infections (STIs). This problem can be solved through an adaptation that triggers the avoidance of mates with cues that are probabilistically linked to an increased rate of disease transmission. Cues carried by a potential sex partner might include poor hygiene, facial acne, lip or mouth lesions, genital sores, or interest in sexual activities involving bodily substances. These cues are hypothesized to activate sexual disgust and lead to the avoidance of sexual activities with potential mates who possess them. We hypothesize that sexual disgust towards items subsumed by the Hygiene, Oral sex, or Promiscuity factors, as well as towards the deviant sex subscale of the Taboo factor, also function to avoid sexual contact with pathogenic vectors.

Another category of costly sexual partners is genetic relatives. Offspring produced by inbreeding have a less diverse allelic combination, are more susceptible to infection, and experience a higher risk of blindness, deafness, malformed limbs, and psychological disorders such as schizophrenia (e.g., Lieberman

---

[1] Corresponding author contact info: dbuss@austin.utexas.edu, 108 E. Dean Keeton St., A8000, Seay Psychology Building, Austin, Texas, 78712

& Smith, 2012; Lieberman, Fessler, & Smith, 2011; Lieberman, Tooby, & Cosmides, 2007). Previous research confirms that most individuals consider sex between relatives psychologically or emotionally unsettling (Ackerman, Kenrick, & Schaller, 2007; Haidt, Bjorklund, & Murphy, 2000). Our studies corroborate previous research; we found that people are particularly sexually disgusted by the idea of sex with three classes of close genetic relatives: parents, children, and siblings. Specifically, disgust towards sex with these classes of genetic relatives—which are subsumed under the incest subscale of the Taboo factor—is hypothesized to prevent individuals from engaging in sexual activities that produce these deleterious consequences. All else equal, increased genetic relatedness should result in higher levels of sexual disgust and avoidance of sexual contact. Future research could also

Courtney Crosby, M.A.

Table 1. The Sexual Disgust Inventory factors and items

Factors	Taboo	BDSM	Oral sex	Same-sex attraction	Hygiene	Promiscuity
Items	1. Having sex with your child 2. Having sex with a dead person 3. Sex with animals 4. Rape 5. Pornography involving children 6. Having sex with your sibling 7. Sexual pleasure through use of human feces 8. Vomiting during sex 9. Having sex with your parent 10. Having sex with someone who is underage	1. Whipping someone during sex 2. Inflicting pain on someone during sex 3. Bondage on a woman 4. Choking someone during sex 5. Domination or submission during sex 6. Bondage on a man 7. Spanking someone during sex	1. A man performing oral sex on a woman 2. Simultaneous oral sex ("69") 3. A woman performing oral sex on a man 4. Licking someone during sex	1. Male homosexuality 2. Sex between two men 3. Female homosexuality 4. Sex between two women	1. Having sex with someone who has unpleasant body odor 2. Having sex with someone who has bad breath	1. Group sex or orgies 2. Agreement between partners to have sex with people outside of the committed relationship ("swinging") 3. Threesomes or sex involving three people 4. Watching pornography

Note. For more details, please see: Crosby, C. L., Durkee, P. K., Meston, C. M., & Buss, D. M. (2020). Six dimensions of sexual disgust. *Personality and Individual Differences*, 156, 109714.

investigate whether individuals feel the same level of sexual disgust towards psychologically close, but genetically unrelated, relatives such as step-siblings or step-parents.

Another critical adaptive problem that individuals, particularly women, might face during sexual encounters is suffering from physical violence. Physical violence during sex can result in a host of negative effects, ranging from open wounds to post-traumatic stress disorder or sexual dysfunction (Jina & Thomas, 2013; Turchik & Hassija, 2014). Several items on the BDSM factor represent activities that may lead to physical harm when practiced unsafely. Individuals who engage in consensual BDSM typically have a pre-established safe word, which presumably functions to prevent activities that can cause real harm (Jozifkova, 2013). Sexual disgust towards the items subsumed under the BDSM factor may also operate to prevent individuals from engaging in sexual activities that may lead to physical harm if practiced unsafely.

In sum, these evolutionarily informed hypotheses suggest that sexual disgust is an evolved emotion that functions to avoid hazards such as pathogen vectors transmitted through sexual contact and harms caused by inbreeding and sexual violence.

Sex Differences in Sexual Disgust

In contrast to minimal sex differences in many psychological domains, women and men differ dramatically in their baseline levels of sexual disgust. On average, women are more sexually disgusted than men. These sex differences are large and highly replicable, with effect sizes, as measured by Cohen's ds, ranging from .60 to 1.54 (Al-Shawaf, Lewis, & Buss, 2018).

A number of evolutionarily informed hypotheses have been advanced that might explain these large sex differences (Al Shawaf et al., 2018). These include (1) *the parental investment hypothesis*, which suggests women's higher levels of sexual disgust may stem from the greater costs they face from injudicious sexual choices; (2) *the sexually transmitted infections hypothesis*, which suggests that because women's genital anatomy renders them more vulnerable to communicable diseases compared to that of men, they may have higher levels of sexual disgust; (3)

Professor David Buss

the rape avoidance hypothesis, which suggests that some forms of sexual disgust help women to avoid contact with sexually coercive men; and (4) *the reputational damage hypothesis*, which suggests that women may have higher levels of sexual disgust because they face higher costs, such as a decline in perceived mate value, when being socially labeled as promiscuous. Moreover, contaminations and infections contracted through sexual contact are more likely to be passed from mother to infant or young child than from father to offspring due to lactation and greater maternal physical contact with offspring. Tests of which of these factors, or which combination of factors, best explains the large sex difference in sexual disgust remain to be conducted.

Some scientific clues, however, may be found in our own research. For example, we found the largest sex difference among our six factors of sexual disgust on the Promiscuity factor, which assess attitudes towards non-monogamous sex (Crosby et al., 2020). Women were significantly more sexually disgusted than were men by these sexual activities across two independent studies. Since having multiple sex partners puts women at greater risk than men of STIs, exposes women to more sexually coercive contexts, and is linked to an increased risk of reputational damage, these findings provide

circumstantial support for the second, third, and fourth hypotheses.

The Computational Structure of Sexual Disgust

To solve these critical adaptive problems and sex differences, sexual disgust must become activated within appropriate contexts. As a result, sexual disgust is hypothesized to be calibrated to many context-specific input variables, such as mate availability, genetic relatedness, and mate-value (Lieberman & Patrick, 2018, pp. 94). It is further hypothesized that together, these inputs are weighted to trigger an internal regulatory system that calculates an expected sexual value—a surrogate marker for ancestral reproductive costs and benefits—of each partner or situation. If the expected sexual value of a particular sexual situation or partner is low, sexual disgust and avoidance of sex is hypothesized to be the behavioral output. Conversely, a high expected sexual value is hypothesized to lead to a lack of sexual disgust and approach of the sexual situation.

For example, people generally try to pursue potential partners of high mate value—those who are healthy, attractive, socially skilled, or rich in allies and resources. This is a strategy that reaps high rewards when it works effectively. However, if there is a small pool of potential mates to choose from (i.e., low mate availability), being increasingly choosy may impair an individual's success by rendering them unable to obtain any partner at all (Daly & Wilson, 2001). Sexual disgust in this context may therefore be downregulated—albeit unconsciously through this internal regulatory system—in order to increase the chances of successfully procuring a mate.

Previous studies and measures of sexual disgust have not captured the full range of important adaptive problems that individuals must navigate in the sexual sphere. The different context-specific inputs that can activate sexual disgust and the many adaptive problems that individuals must solve is corroborated by our empirical discovery that sexual disgust has a multi-dimensional structure (Crosby et al., 2020). Future research should investigate how the context-specific inputs that underlie our six-factor measure of sexual disgust are weighted in

a range of different contexts, and how these differ for men and women.

Sexual Disgust Interacts with Other Psychological and Physiological Systems

Previous research also provides evidence that sexual disgust is linked to other emotions and psychological processes. For example, research suggests that sexual disgust has an inhibitory effect on sexual arousal and that it is involved in the development and maintenance of sexual pain disorders in women (see Crosby, Buss, & Meston, 2019 for a review). Sexual disgust has been shown to have an inhibitory effect on short-term mating interest—inducing sexual disgust leads to a reduction in short-term mating interest above and beyond the induction of pathogen disgust (Al-Shawaf et al., 2019). Evidence also shows that individuals interested in sexual variety, that is dispositionally inclined to short-term mating, tend to have lower average ratings of sexual disgust compared to their long-term mating-oriented counterparts (Al-Shawaf, Lewis, & Buss, 2015; O'Shea, DeBruine, & Jones, 2019; Tybur & Gangestad, 2011). Understanding how sexual disgust influences, and is influenced by, other psychological systems, such as sexual arousal and the proclivity to pursue different mating strategies, renders exploration of this emotion of considerable scientific interest.

Conclusion

In summary, the evidence for six dimensions of sexual disgust as discovered through our research suggests multiple domains toward which sexual disgust might be directed. The inclusion of these six factors of sexual disgust is critical in exploring (1) the different adaptive problems that sexual disgust is hypothesized to solve, (2) the origins of sex differences in sexual disgust, (3) the computational architecture of this emotion (i.e., the inputs, procedures, and behavioral outputs of this emotion), (4) and how this emotion relates to other aspects of sexuality such as sexual functioning, sexual strategies, or sexual satisfaction. The evolutionary hypotheses advanced to explain the different facets of sexual disgust offer heuristic value, and should help guide future researchers to explore this relatively uncharted emotion.

References

Ackerman, J. M., Kenrick, D. T., & Schaller, M. (2007). Is friendship akin to kinship? *Evolution and Human Behavior*, *28*, 365–374.

Al-Shawaf, L., Lewis, D. M., Ghossainy, M. E., & Buss, D. M. (2019). Experimentally inducing disgust reduces desire for short-term mating. *Evolutionary Psychological Science*, *5*(3), 267-275.

Al-Shawaf, L., Lewis, D. M., & Buss, D. M. (2018). Sex differences in disgust: Why are women more easily disgusted than men?. *Emotion review*, *10*(2), 149-160.

Al-Shawaf, L., Lewis, D. M., & Buss, D. M. (2015). Disgust and mating strategy. *Evolution and Human Behavior*, *36*(3), 199-205.

Crosby, C. L., Durkee, P. K., Meston, C. M., & Buss, D. M. (2020). Six dimensions of sexual disgust. *Personality and Individual Differences*, 156, 109714.

Crosby, C. L., Buss, D. M., & Meston, C. M. (2019). Sexual disgust: Evolutionary perspectives and relationship to female sexual function. *Current Sexual Health Reports*, *11*(4), 300-306.

Daly, M., & Wilson, M. (2001). Risk-taking, intrasexual competition, and homicide. In J. A. French, A. C. Kamil, & D. W. Leger (Eds.), *Vol. 47 of the Nebraska symposium on motivation. Evolutionary psychology and motivation* (pp. 1–36). University of Nebraska Press.

Darwin, C. (1872). The origin of species by means of natural selection: or, the preservation of favoured races in the struggle for life and the descent of man and selection in relation to sex. Modern library.

Haidt, J., Bjorklund, F., & Murphy, S. (2000). *Moral dumbfounding: When intuition finds no reason*. Unpublished manuscript, University of Virginia.

Jina, R., & Thomas, L. S. (2013). Health consequences of sexual violence against women. *Best Practice & Research Clinical Obstetrics & Gynecology*, 27(1), 15-26.

Jozifkova, E. (2013). Consensual sadomasochistic sex (BDSM): The roots, the risks, and the distinctions between BDSM

and violence. *Current Psychiatry Reports*, *15*(9), 392.

Kort, R., Caspers, M., van de Graaf, A., van Egmond, W., Keijser, B., & Roeselers, G. (2014). Shaping the oral microbiota through intimate kissing. *Microbiome*, *2*(1), 41.

Lieberman, D., & Patrick, C. (2018). *Objection: disgust, morality, and the law* (pp. 72-108). Oxford University Press.

Lieberman, D., & Smith, A. (2012). It's all relative. *Current Directions in Psychological Science*, *21*(4), 243–247.

Lieberman, D., Fessler, D. M. T., & Smith, A. (2011). The relationship between familial resemblance and sexual attraction: An update on Westermarck, Freud, and the incest taboo. *Personality and Social Psychology Bulletin*, *37*(9), 1229–1232.

Lieberman, D., Tooby, J., & Cosmides, L. (2007). The architecture of human kin detection. *Nature*, *445*(7129), 727.

O'Shea, K. J., DeBruine, L. M., & Jones, B. C. (2019). Further evidence for associations between short-term mating strategy and sexual disgust. *Personality and Individual Differences*, *138*, 333-335.

Turchik, J. A., & Hassija, C. M. (2014). Female sexual victimization among college students: Assault severity, health risk behaviors, and sexual functioning. *Journal of Interpersonal Violence*, *29*(13), 2439-2457.

Tybur, J. M., & Gangestad, S. W. (2011). Mate preferences and infectious disease: Theoretical considerations and evidence in humans. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *366*(1583), 3375-3388.

Tybur, J. M., Lieberman, D., & Griskevicius, V. (2009). Microbes, mating, and morality: Individual differences in three functional domains of disgust. *Journal of Personality and Social Psychology*, *97*(1), 103.

Weiss, M. D. (2006). Mainstreaming kink: The politics of BDSM representation in US popular media. *Journal of Homosexuality*, 50(2-3), 103-132.

Feature article: Emotion & Evolution

Internalized Norms and Intrinsic Motivations: Are Normative Motivations Psychologically Primitive?

Daniel Kelly[1]

Department of Philosophy
Purdue University

Introduction

The possibility that normative motivations are basic or psychologically primitive is an intriguing one worthy of more attention. On the one hand, there is a powerful case that human minds are equipped with a psychological system dedicated to norms and norm-guided behavior (Setman & Kelly, forthcoming). On the other hand, there has not yet been a convincing case made that there are any distinct, *sui generis* motivational resources that are unique or exclusive to this system. To the extent that the issue is addressed, many discussions simply proceed as if the motivations that drive different norm-guided behaviors are drawn from a number of different and more basic psychological sources. However, I do not think the possibility that some normative motivations are psychologically primitive has been ruled out.

My modest aim in this piece is to frame and illuminate some of the issues surrounding normative motivation, rather than take a firm position on any of them. I begin by clarifying the key terms in my title of this essay, and unpacking some of the assumptions that underpin its question. I then distinguish four kinds of answers one might give. In this short essay I will not be able to properly develop and evaluate an argument for the view that normative motivations

are psychologically primitive, but I will have some comments about what such an argument might look like, and what it would have to show.

Spotlight on Internalized Norms

Norms are the often informal rules that structure human behavior, regulating what is appropriate, required, prohibited, or permitted. Such rules govern human activities ranging from dress codes and workplace hierarchies to mate selection and courtship traditions; from dining practices and conversational etiquette to family dynamics and religious rituals (Henrich, 2015; Bicchieri, 2016; Gelfand, 2018). Researchers have produced a number of taxonomies that classify norms, some by reference to the behaviors they govern (sartorial norms, dining norms, conversational norms), others by reference to the values they help realize (care norms, purity norms, individualistic norms), and still others by reference to the ways in which they are stabilized (conventional norms, descriptive norms, injunctive norms) (see O'Neill, 2017). Norms can also be distinguished by reference to the functional role they occupy in the psychological economy of an individual person.

Here a key notion is that of an *internalized norm*. The notion has a venerable history in anthropology and sociology, and has recently been taken up by cognitive scientists, evolutionists, and behavioral economists. For example, Gintis (2003) describes internalized norms as "enforced in part by internal sanctions, including shame, guilt and loss of self-esteem, as opposed to purely external sanctions, such as material rewards and punishments" (p. 407). In a recent paper modeling the kinds of evolutionary dynamics that might have produced the capacity to internalize norms, Gavrilets and Richerson (2017) state that "Certain norms are internalized, that is, acting according to a norm becomes an end in itself rather than merely a tool in achieving certain goals or avoiding social sanctions" (p. 1). Finally, Henrich and Ensminger (2014)

characterize internalized norms in terms of their "emotional, or motivational, aspect," claiming that these are marked by the fact that the "desire to adhere to norms and to see them enforced appears to be internally motivated in some fashion. Once internalized, norms become ultimate ends, goals, or values in themselves" (p. 22). While they differ in the specifics, all of these descriptions share the idea that a norm has been internalized by a person when it comes to bear a special kind of connection to her motivational apparatus. Moreover, they all depict that connection as rather direct and robust, suggesting that a person's impetus to follow a norm she has internalized is insulated from other influences. Relative to rules she has not internalized, her motivation to conform to an internalized norm is less affected by, for example, the presence or absence of material rewards or punishments, the likelihood of social sanction from others, or changes to other relevant aspects of her external environment.

Indeed, the category of an internalized norm is often brought into focus by appeal to other categories of rules whose members are likewise not distinguished by their content, but rather by the different way they are related to an individual's psychological makeup. Consider an example of what can be called an *incentivized norm*. Imagine someone who loves to drive fast, but stays under a 55 mph speed limit to avoid getting a ticket or losing her driver's license. If the limit goes up to 80 mph, or if the driver enters a section of the highway she knows is empty of police, she will no longer be motivated to stay below 55, and will indulge her need for speed. Such examples illustrate that people follow some rules merely as a means to something else, some outcome or consequence beyond the rule itself. In more familiar terms, a person is only *instrumentally* motivated to comply with her incentivized norms, and if the external incentives change or disappear, then so too does a person's proximate motivation to comply with the rule. It is tempting to describe these as cases in which the person is motivated to follow the rule "by" the incentive, but this is slightly misleading. Strictly speaking, the most proximate motivator of the person's behavior isn't the external incentive itself, but still some internal psychological state or other. Incentivized norms differ from

Professor Daniel Kelly

internalized norms is that in the former case, whatever the relevant motivating state (a desire, a fear, a goal, etc.), that state is more directly sensitive to the presence or absence of the external incentive than it is to the internally represented rule.

Turning to internalized norms, the idea of internalization can be further developed by appeal to a *norm system*. There is a growing case that human minds have an evolved capacity dedicated to norms and norm guided behavior (Chudek & Henrich, 2011; House et al., 2019; Kelly & Davis, 2018; Kelly & Stich, 2007; Mikhail, 2011; Nichols, 2004, forthcoming; O'Neill & Machery, 2018; Richerson & Boyd, 2005; Sripada & Stich 2007; Tomasello, 2016). While many details remain to be settled, the norm system can be thought of a package of psychological mechanisms that undergird a capacity to "do" norms. This capacity is marked by a person's propensities to detect and acquire the behavior-guiding rules prevalent in her social environment, to keep her own behavior in conformity with those norms, and to enforce norms by sanctioning those who violate them. Evidence suggests that the psychological machinery dedicated to performing these tasks of acquisition, compliance, and enforcement

exhibits many of the characteristics of so-called System 1 cognition, especially domain specificity and automaticity (Kahneman, 2011). Together these allow the norm system to operate alongside of and with some degree of independence from other psychological processes, including practical reasoning, reflective deliberation, and conscious volition.

Putting this thumbnail sketch of a norm system together with the characterizations of "internalized norms" offered above suggests a straightforward interpretation: a person has internalized a rule once it has come to be represented in her norm system, once it is acquired and stored in this specific part of her mind. And in virtue of coming to occupy the particular functional role carved out by the norm system, the rule also thereby gets connected up to her motivational apparatus in a special and direct way, such that her compliance and enforcement of the norm is different from and not merely, in the sense spelled out above, instrumental (for example, see Fehr & Falk, 2002; Fehr & Gächter, 2002; Gneezy & Rustichini, 2000). Thus, a person has internalized those rules that are represented in her norm system, and those rules are imputed with what can be called *intrinsic normative motivation*.[2] Unlike incentivized norms, norms that have been internalized activate their associated behavioral tendencies directly, bypassing—and thus independently of—practical reasoning. Indeed, since the influence of a person's internalized norms on her behavior is typically not mediated by practical reasoning or

reflective decision making, that influence will often have to be inhibited if she is to refrain from acting on the rule.[3]

One last note: the categories of incentivized and internalized norms do not exhaust the ways that rules can be represented in the human mind or connected to motivation and behavior. People can *merely cognize* rules. They can know about rules without being in any way motivated to enforce or keep their own behavior in line them. For example, a fan may have an exhaustive knowledge of the NBA rule book even though he never plays basketball himself, or a scholar of Ancient Greece may have spent a lifetime developing an encyclopedic knowledge of the norms that governed social life in the heyday of Sparta. Despite their expertise, in neither case are the respective rules internalized in the sense at issue here. People can also create and adopt their own rules. *Avowed norms* are those that an individual voluntarily imposes on himself, typically after explicitly formulating, reflecting on, and deliberately endorsing them. When a person, say, chooses to stop drinking, or decides to write in a journal for 30 minutes every day, he adopts a rule he will try to satisfy and stay committed to going forward. This capacity to choose, endorse, and follow our own rules is crucial for self-determination and identity formation, and is of great interest to philosophers concerned with agency and autonomy (Callard, 2018; Ismael, 2016; Korsgaard, 2009).[4] There is also reason to think that avowed norms are undergirded by psychological machinery and

---

[2] Though it is not an uncommon locution, it is surprisingly tricky to say exactly what might be meant by calling motivation *intrinsic* other than: "not instrumental". The terms "intrinsic" and "extrinsic" are obviously not specific to motivation, emotion, or even psychology; like "internal" and "external", or "endogenous" or "exogenous", they merely mark their subject matter as falling on one side or another of some boundary. As noted above, there's an important sense in which all motivating states are "internal" to a person's mind. Moreover, use of these terms in cognitive science is complicated by the recent debates over active and passive externalism and the rise in visibility of different accounts of embodied, embedded, and extended cognition, all of which have blurred the boundary between what is internal and

external to minds in general. Future research is needed to help clarify the issue.

[3] Internalized norms may produce an eccentric phenomenology as well. For instance, Stanford (2018) notes that from a subjective point of view, some norms exhibit a "puzzling combination of objective and subjective elements" (p. 2). Ramstead et al. (2016) develop a notion of "cultural affordance" that provides what appears to be a promising way of capturing how a person's internalized norms can influence her first-person perspective.

[4] To put this point more carefully, individuals are at least able to choose *some* of the rules they are bound by; see Witt (2011) and Davidson and Kelly (2018) for discussions that distinguish between norms that an individual embraces voluntarily versus those that she has ascribed to her by other people.

motivational resources that are quite distinct from those associated with the norm system (for longer discussion, see Kelly, forthcoming).

Four Views on the Nature of Normative Motivations

Having clarified my subject matter, my question can be further fleshed out: How do internalized norms reliably produce the compliance and punishment behaviors associated with them? What is the nature and character of intrinsic normative motivations? How are these psychological states related to other, more familiar or better understood motivational states contained in human minds?

The sentimentalist tradition in philosophy has inspired a recently influential line of empirical work in moral psychology that can speak to these questions. This perspective has been fruitful, helping to generate evidence that many important norm-guided behaviors and evaluations are driven by specific emotions like anger, contempt, disgust, or shame (Haidt et al., 2001; Nichols, 2004; Rozin et al., 1999; c.f. Prinz, 2009).[5] Many versions of this view see these normative behaviors and evaluations as being infused by the particular character of the specific emotion to which they are connected. For example, witnessing the violation of an internalized norm that is connected to anger will motivate a piece of behavior that drives the witness to sanction the transgression, but her sanctioning behavior will also be inflected with many of the characteristics associated with paradigmatic instance of anger in general (approach tendencies, heightened arousal, perhaps the distinctive facial expression). Much of this work also assumes a (common but also contested) view of basic emotions: there are only a handful of them, they are relatively discrete, they are humanly universal and have deep evolutionary roots, and they are themselves psychologically basic and intrinsically motivating (Ekman, 1992; Izard, 2007; Ledoux,

2012; Panksepp & Watt, 2011; Panksepp & Biven, 2012).

This perspective suggests what can be called the *Basic Emotions View*; it is really a family of views, but I'll consolidate for ease of discussion. The view suggests straightforward answers to the questions about normative motivations. It acknowledges that not all of the rules a person cognizes are connected to basic emotions, but those that are typically inherit many features of the emotion to which they are connected, including, most importantly, the emotion's intrinsic motivating force.[6] Translating this into the terminology developed in the last section implies that internalized norms are those that are intrinsically motivating, and an intrinsically motivated norm gets its motivational force from the basic emotion to which it is connected. The Basic Emotions View also suggests another key task performed by the norm system, namely that of executing a *bundling function* of pairing up each rule it acquires with (on this view) one of the basic emotions. The norm system thus draws on motivational resources endogenous to and made available by basic emotions, but directs and shapes them it in new and important ways as well. The emotion is thus transformed on both ends. Upstream, its appraisal conditions will be modified, as the set of cues that activate the emotion will be expanded to include those specified by the compliance and violation conditions for the norm. Downstream, the psychological combination of a rule with its associated basic emotion will channel the motivational force rooted in the emotion (along with some of its more resilient characteristics) into the specific compliance and punishment behaviors encoded in the rule.

A second kind of view takes this template and liberates it from the emotions. The *Multiple Building Blocks View* holds onto the account of the norm system and its bundling function, but expands the set of motivational building blocks it can recruit. The view can take many forms,

---

[5] Much of this work also recognizes different categories of behavior-guiding rules. Moreover, many researchers identify those rules that enjoy some kind of tight connection to basic emotions as *moral norms*; see especially Nichols (2004).

[6] See Kelly (2011, 2013) for this kind of account of purity norms and the emotion of disgust, worked out in terms of a byproduct hypothesis concerning the emotion and norms it gets co-opted to help motivate. Violators of purity norms are often thought of as not just wrong but tainted and contaminating.

depending on what a theorist includes on the list of resources from which the norm system is able draw. For instance, it might be the case that some internalized norms are paired with and inherit the motivational force not of basic emotions but of intrinsically motivating mental states like *desires*, *preferences,* or *attitudes* (Arpaly & Schroeder, 2014; Bicchieri, 2016; c.f. Brennan et al., 2013). Alternatively, theorists could appeal to motivational building blocks that take the form of other dedicated psychological systems.[7] A plausible set of candidates here are mechanisms associated with *social learning*. Evidence suggests that humans are natural social learners (Laland, 2017; Mathew & Perreault, 2015), and are outfitted with dedicated and early emerging psychological machinery that induces young children to spontaneously imitate (and often overimitate) others (Hoehl et al., 2019). This suite of mechanisms appears to be equipped with the kind of intrinsically motivating resources the norm system could easily recruit, especially to ensure people conform to norm-governed behaviors they observe, and thus to comply with the norms that they internalize (Kenward et al., 2011; Kenward, 2012; Keupp et al., 2013). The capacity for spontaneous and intuitive imitation seems to emerge in tandem with core elements of the capacity for norms as well (Schmidt, Butler et al., 2016; Schmidt, Rakoczy et al., 2011; Schmidt & Tomasello, 2012; Vaish et al., 2016). While it seems a relatively easy step to go from behavior imitation to norm compliance, it is less clear how appeal to social learning capacities might account for intrinsic motivations to enforce norms and punish transgressors. However, the Multiple Building Blocks View is amenable to the possibility that for any given internalized norm, the intrinsic motivation to *comply* is supplied by a different psychological building block than the intrinsic motivation to *enforce*.[8]

On any version of these two views, normative motivations will not be primitive. Rather, these motivations will get their identity as *normative* motivations in virtue of the roles they have been recruited to play in the norm system: to ensure reliable compliance with and enforcement of internalized rules. But the intrinsic motivational force that those recruited resources bring to bear on their new functions is antecedent to their being bundled together with their associated norm. This result seems to straightforwardly hold on a third view as well, which can be called the *Basic Affect View*. This kind of picture, inspired by recent work by Lisa Feldman Barrett and her colleagues, suggests that affect itself is a (perhaps the) basic psychological primitive: normative motivations are not primitive states to be sure, but neither are emotions like disgust, anger or shame. None of these are fundamental components of human minds, but are rather constructed out of more basic psychological elements, namely affect and perhaps a propensity to copy others' affective tendencies. (see especially Barrett & Bliss-Moreau, 2009, but also Barrett, 2006a, 2006b, 2017, and Duncan & Barrett, 2007). Application of this perspective to norms and norm-guided behavior is in its infancy (see Theriault et al 2020), but it suggests a promising pathway for future research

The Basic Emotions View, the Multiple Building Blocks View, and the Basic Affect View all depict internalized norms not as being driven by the type of slow, deliberate, effortful cognition associated with reflective reasoning and fully conscious deliberation. Nor, however, do they depict the norm system as an ancient or foundational platform of mammalian or primate minds. Rather, they all portray it as a middle tier kludge[9], an evolutionary latecomer imposed by a tinkering Mother Nature on a more basic motivational repertoire, the elements of which it harnesses and bundles and channels and thereby

---

[7] For example, see Blair's (1995) appeal to a violence inhibition mechanism (VIM); see Nichols (2004, chapter 1) for critical discussion.

[8] Stich (2019) interprets Henrich (2015) as suggesting something along these lines when he characterizes a proto-norm as "a culturally transmitted (i.e., socially learned) package of psychological states that includes: (i) a desire to engage in a certain pattern of behavior

under specified circumstances; (ii) a desire that other people do the same; and (iii) an emotion elicitor that leads to an agonistic emotion (typically anger or disgust) when one becomes aware that another person is not behaving in the desired way. These emotions can and sometimes do lead to punitive behavior directed at people who do not behave in the desired way" (p. 8).

[9] See Markus (2009).

transforms. An interesting upshot of these views is that as the norm system recruits more basic motivational states, it does not leave them completely unchanged. Rather, the norm system imposes new tasks on the component parts it recruits, and as those parts are integrated into the functioning of this larger embedding system, their operations are tailored so that they are better able to perform their newly acquired functions. These more basic motivational states often remain recognizable even as they are pressed into novel roles, retaining their identity even as they are repurposed and transfigured by their new circumstances.[10]

A fourth and final possibility diverges from this general picture and holds that normative motivations are in fact basic. According to a *Basic Normative Motivations View*, available and endogenous to the norm system is a form of distinctive intrinsic motivation that it can pair with an acquired rule, and that the norm system can access without having to do any recruiting outside of itself. On this view, the norm system does not require any further resources in order to provide intrinsic motivation to an internalized norm.[11]

Such a view seems clearly coherent. What would it take to show that it is true? What kinds of arguments and evidence could be marshalled in favor of it? This deserves more careful consideration than I can deliver here, but I will end by pointing to a useful template. In his paper "Basic Questions", Carruthers (2018) argues that curiosity and questioning attitudes are primitive, foundational components of human and animal minds. He construes curiosity as "an affective (desire-like or emotion-like) motivational state whose content is a question" (p. 136); a proponent of the Basic Normative Motivations View might similarly construe an internalized norm as an affective motivational state whose content is an injunction. The proponent could then follow Carruthers' playbook of trying to establish that

such internalized norms are likewise foundational by showing that the psychological machinery underlying such norms have a deep phylogenetic history.

Carruthers looks to comparative psychology to make the case that curiosity-like states are found in a variety of other animals. This argumentative strategy is worth pursuing for internalized norms as well. It might be more of an uphill battle, however. The most widely accepted view currently seems to be that the full range of social behaviors associated with a psychological capacity dedicated to norms are *not* found among other animals, and that the norm system itself does not have a long evolutionary history, but is indeed uniquely human (for example see Boyd, 2017; Riedl et al., 2012). However, those working on animal cognition have begun pushing back on this (Andrews, 2020; Fitzpatrick, under revision; Vincent et al., 2019; von Rohr et al., 2011).

In addition to these comparative arguments, there are more general evolutionary grounds for taking seriously the possibility that human normative motivation is a relatively recent adaptation not shared with other animals, and is a *sui generis*, psychologically primitive component of our minds. Modern human beings are the product of uniquely powerful forms of gene-culture coevolution and cumulative niche construction (Richerson & Boyd, 2005; Stotz 2010). Normative motivations that are both distinctively human and psychologically basic may have been installed in our minds by the kinds of culture-driven genetic selective pressures that have recently (in evolutionary time) driven our species down its unique evolutionary pathway (Henrich 2015; Sterelny, 2012). Exploring this possibility empirically may have to rely on an argument from exclusion and proceed by a kind of process of elimination, ruling out possible explanations in which the behaviors and intrinsic motivations associated with an internalized norm are accounted for by appeal to some other

---

[10] See Anderson (2014) for a convincing argument that the kind of "reuse" described here is the rule rather than the exception in the brain, and Richerson and Boyd (2001) for an account of how evolutionary pressures that selected for abilities to coordinate and cooperate at larger scales ended up remodeling human social psychology.

[11] Such a view is at least suggested by Sripada and Stich (2007), whose boxological model depicts the compliance and punitive motivations associated with internalized norms as distinct from emotion systems, which are represented by their own, separate box.

identifiable source, be it another psychological system (for imitation, for more sophisticated forms of social learning, for anger or disgust), or some other mental state (a desire, attitude, affect etc.). Once more fine-grained hypotheses about normative motivations have been formulated, emerging brain scan technologies and new experimental techniques will surely help enrich investigations as well.

Conclusion

Even if this last view turns out to be false and normative motivations are not psychologically *primitive*, they can still be psychologically *special* in interesting and important ways. For example, *normative motivation* can still pick a category of mental state that, while not basic, is nevertheless distinctive in the sense that appeals to normative motivations as such—rather than merely to the more primitive building blocks they are constructed out of—may be indispensable for explaining large swaths of human behavior, especially those related to large scale coordination, cooperation, and morality.

I have my suspicions about many of these issues, but no definitive answers or impregnable arguments to offer. I hope to have made some headway clarifying some of the conceptual landscape and drawing attention to the exciting questions that work on norm psychology continues to raise about normative motivation and its connection to affect and emotion. Formulating questions is often a prelude to progress, if not a kind of progress itself. Inevitably questions raise more questions, too. For example, how could we make psychological sense of the idea suggested by some mathematical models that internalization comes in degrees, with "oversocialized" individuals internalizing their norms more fully than those who are "undersocialized" (Gavrilets & Richerson, 2017)? How is the dimension of over- and under-socialization related to the dimension of tightness and looseness recently explored by Gelfand and her colleagues (Gelfand et al., 2011)? How and by what mechanisms do the kinds of norms that a person has already internalized affect their ability to internalize new norms (Hagger et al., 2014)? These too are fascinating questions, and I can't wait to see our collective attempts to answer them play out.

References

Anderson, M. L. (2014). *After Phrenology: Neural Reuse and the Interactive Brain*. MIT Press.

Andrews, K. (2020). Naïve normativity: The social foundation of moral cognition. *Journal of the American Philosophical Foundation, 6*(1), 36-56.

Arpaly, N., & Schroeder, T. (2014). *In Praise of Desire*. Oxford University Press.

Barrett, L. (2006a). Valence is a basic building block of emotional life. *Journal of Research in Personality*, 40, 35–55.

Barrett, L. (2006b). Are emotions natural kinds? *Perspectives on Psychological Science*, 1, 28–58.

Barrett, L.F., & Bliss-Moreau, E. (2009). Affect as a psychological primitive. *Advances in Experimental Social Psychology,* 41, 167-218.

Barrett, L. (2017). *How Emotions Are Made: The Secret Life of the Brain*. Mariner Books.

Bicchieri, C. (2016). *Norms in the Wild: How to Diagnose, Measure, and Change Social Norms.* Cambridge University Press.

Blair, R. J. R. (1995). A cognitive developmental approach to morality: Investigating the psychopath. *Cognition, 57*, 1-29.

Boyd, R. (2017). *A Different Kind of Animal: How Culture Transformed Our Species* Princeton University Press.

Brennan, G., Eriksson, L., Goodin, R., & Southwood, N. (2013). *Explaining Norms.* Oxford, Oxford University Press.

Callard, A. (2018). *Aspiration: The Agency of Becoming*. Oxford University Press.

Carruthers, P. (2018). Basic questions. *Mind & Language*, *33*, 130–147.

Chudek, M., & Henrich, J. (2011). 'Culture–gene coevolution, norm-psychology and the emergence of human prosociality. *Trends in Cognitive Sciences*, *15*(5), 218-226.

Davidson, L., & Kelly, D. (2018). Minding the gap: Bias, soft structures, and the double life of social norms. *Journal of Applied Philosophy*, 1-21.

Duncan, S., & Barrett, L. (2007). Affect is a form of cognition: A neurobiological analysis. *Cognition and Emotion, 21*(6), 1184–1211.

Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion*, *6*, 169-200.

Fehr, E., & Falk, A. (2002). Psychological foundations of incentives, *European Economic Review, 46*, 687–724.

Fehr, E., & Gächter, S. (2002). Do incentive contracts undermine voluntary cooperation? *SSRN*.

Fitzpatrick, S. (Under Revision). Chimpanzee normativity: Evidence and objections.

Gavrilets, S., & Richerson, P. (2017). Collective action and the evolution of social norm internalization, *Proceedings of the National Academy of Sciences*, *114* (23), 6068-6073.

Gelfand, M. (2018). *Rule Makers, Rule Breakers: How Tight and Loose Cultures Wire Our World*. Scribner.

Gelfand, M. et al. (2011). Differences between tight and loose cultures: A 33-nation study. *Science*, 332, 1100 -1104.

Gintis, H. (2003). The hitchhiker's guide to altruism: Gene-culture coevolution, and the internalization of norms. *Journal of Theoretical Biology, 220*, 407–418.

Gneezy, U., & Rustichini, A. (2000). A fine is a price. *The Journal of Legal Studies, 29* (1), 1-17.

Hagger, M. S., Rentzelas, P., & Chatzisarantis, N. L. (2014). Effects of individualist and collectivist group norms and choice on intrinsic motivation. *Motivation and Emotion*, *38*, 215–223.

Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review, 108*, 814-834.

Henrich, J. (2015). *The Secret of Our Success: How Culture Is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter*. Princeton University Press.

Henrich, J., & Ensminger, J. (2014). Theoretical foundations: The coevolution of social norms, intrinsic motivation, markets, and the institutions of complex societies. In J. Ensminger & J. Henrich (Eds.), *Experimenting with social norms: Fairness and punishment in cross-cultural perspective* (p. 19–44). Russell Sage Foundation.

Hoehl, S., Keupp, S., Schleihauf, H., Mcguigan, N., Buttelmann, D., & Whiten, A. (2019). 'Over-imitation': A review and appraisal of a decade of research. *Developmental Review*, *51*, 90-108.

House, B., Kanngiesser, P., Barrett, H. C., Broesch, T., Cebioglu, S., Crittenden, A. N., Erut, A., Lew-Levy, S., Sebastian-Enesco, C., Smith, A. M., Yilmaz, S., & Silk, J. B. (2019). Universal norm psychology leads to society diversity in prosocial behaviour and development. *Nature Human Behaviour*, *1*, 36-44.

Ismael, J. (2016). *How Physics Makes Us Free.* Oxford University Press.

Izard, C. (2007). Basic emotions, natural kinds, emotion schemas, and a new paradigm. *Perspectives on Psychological Science*, *2*, 260–280.

Kahneman, D. (2011). *Thinking Fast and Slow*. Farrar, Straus and Giroux.

Kelly, D. 2011. *Yuck! The Nature and Moral Significance of Disgust*. The MIT Press.

Kelly, D. (2013). Moral disgust and the tribal instincts hypothesis. In K. Sterelny, R. Joyce, B. Calcott, & B. Fraser (Eds.), *Cooperation and Its Evolution* (pp. 503-524). The MIT Press.

Kelly, D. (forthcoming). Two ways to adopt a norm: The (moral?) psychology of avowal and internalization. In M. Vargas & J. Doris (Eds.), *The Oxford Handbook of Moral Psychology*.

Kelly, D., & Davis, T. (2018). Social norms and human normative psychology. *Social Philosophy & Policy, 35*(1), 54 – 76.

Kelly, D., & Stich, S. (2007). Two theories of the cognitive architecture underlying morality. In P. Carruthers, S. Laurence, & S. Stich (Eds.), *The Innate Mind Vol 3.: Foundations and Future Horizons* (pp. 348-366). Oxford University Press.

Kenward, B. (2012). Over-imitating preschoolers believe unnecessary actions are normative and enforce their performance by a third party. *Journal of Experimental Child Psychology, 112*, 195-207.

Kenward, B., Karlsson, M., & Persson, J. (2011). Over-imitation is better explained by norm learning than by distorted causal learning.

Proceedings of the Royal Society B: Biological Sciences, *278*(1709), 1239–1246.

Keupp, S., Behne, T., & Rakoczy, H. (2013). Why do children overimitate? Normativity is crucial. *Journal of experimental child psychology, 116* (2), 392-406.

Korsgaard, C. (2009). *Self-constitution: Agency, Identity, and Integrity*. Oxford University Press.

LeDoux, J. (2012). Rethinking the emotional brain. *Neuron*, *73*, 653–676.

Marcus, G. (2007). *Kluge: The Haphazard Construction of the Human Mind.* Houghton Mifflin.

Mathew, S., & Perreault, C. (2015). Behavioural variation in 172 small-scale societies indicates that social learning is the main mode of human adaptation. *Proceedings of the Royal Society B: Biological Sciences, 282*, 20150061.

Mikhail, J. (2011). *Elements of Moral Cognition: Rawls' Linguistic Analogy and the Cognitive Science of Moral and Legal Judgment.* Cambridge University Press.

Nichols, S. (2004). *Sentimental Rules*: *On the Natural Foundations of Moral Judgment.* Oxford University Press.

Nichols, S. (forthcoming). *Rational Rules*: *Towards a Theory of Moral Learning.*

O'Neill, E. (2017). Kinds of Norms. *Philosophy Compass*, 12(5), 1-15.

O'Neill, E., & Machery, E. (2018). The normative sense: What is universal? What Varies? In A. Zimmerson, K. Jones, & M. Timmons (Eds.), *The Routledge Handbook of Moral Epistemology.* Routledge Press.

Panksepp, J. & Watt, D. (2011). What is basic about basic emotions? Lasting lessons from affective neuroscience. *Emotion Review*, 3, 387–396.

Panksepp, J., & Biven, L. (2012). *The Archaeology of Mind: Neuroevolutionary Origins of Human Emotions.* WW Norton & Company.

Prinz, J. (2009). *The Emotional Construction of Morals*. Oxford.

Ramstead, M. J., Veissière, S. P., & Kirmayer, L. J. (2016). Cultural affordances: scaffolding local worlds through shared intentionality and regimes of attention. *Frontiers in Psychology*, *7*, 1090.

Rakoczy, H., and Schmidt, M.F. (2013). The early ontogeny of social norms. *Child Development Perspectives, 7*(1),17-2.

Richerson, P., & Boyd, R. (2001). The evolution of subjective commitment to groups: A tribal instincts hypothesis. In R. Nesse (Ed.), *The Evolution and the Capacity for Commitment*, (pp. 186-220). Russell Sage.

Riedl, K., Jensen, K., Call, J., & Tomasello, M. (2012). No third-party punishment in chimpanzees. *Proceedings of the National Academy of Sciences of the United States of America, 109*(37), 14824-9.

von Rohr, C., Burkart, J., & Van Schaik, C. (2011). Evolutionary precursors of social norms in chimpanzees: a new approach. *Biol Philos 2011, 26*,1-30

Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology*, *76*(4), 574-586.

Schmidt, M., Rakoczy, H., & Tomasello, M. (2011). Young children attribute normativity to novel actions without pedagogy or normative language. *Developmental Science*, *14*, 530–539.

Schmidt, M., Butler, L., Heinz, J., & Tomasello, M. (2016). Young children see a single action and infer a social norm: Promiscuous normativity in 3-year-olds. *Psychological Science*, 1-11.

Schmidt, M., & Tomasello, M. (2012). Young children enforce social norms. *Current Directions in Psychological Science*, *21*, 232–236.

Setman, S., & Kelly, D. (forthcoming). The psychology of normative cognition. *The Stanford Encyclopedia of Philosophy.*

Sripada, C., & Stich, S. (2007). A framework for the psychology of norms. In P. Carruthers, S. Laurence, & S. Stich (Eds.), *The innate mind: Culture and cognition* (pp. 280-301). Oxford University Press.

Stanford, K. (2018). The difference between ice cream and Nazis: Moral externalization and the evolution of human cooperation. *Behavioral Brain Sciences*, *41*, 1-57.

Sterelny, K. (2012). *The Evolved Apprentice: How Evolution Made Humans Unique*. The MIT Press.

Stich, S. (2019) Did religion play a role in the evolution of morality? *Religion, Brain & Behavior*, 1-11.

Stotz, K. (2010). Human nature and cognitive–developmental niche construction. *Phenomenology and the Cognitive Sciences, 9*, 483–501.

Theriault, J. E., Young, L., & Barrett, L. F. (2020). The sense of should: A biologically-based model of social pressure. *Physics of Life Reviews*.

Tomasello, M. (2016). *A Natural History of Human Morality*. Harvard University Press.

Vaish, A., Herrmann, E., Markmann, C., & Tomasello, M. (2016). Preschoolers value those who sanction non-cooperators. *Cognition, 153*, 43-51.

Vincent, S., Ring, R., & Andrews, K. (2018). Normative practices of other animals. In A. Zimmerman, K. Jones, & M. Timmons (Eds.) *The Routledge Handbook of Moral Epistemology* (pp. 57-83). Routledge.