HUMAN CULTURES THROUGH THE SCIENTIFIC LENS

Essays in Evolutionary Cognitive Anthropology

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Safety, Threat, and Stress in Intergroup Relations

A Coalitional Index Model

with Rengin Firat & Florian van Leeuwen[1]

Contacts between people from different groups engage a variety of human competencies and motivations, from high-level representations of social categories to visceral responses when confronted with strangers, from cognitive appraisal of conflict to a desire to exclude or even attack 'others.' There is a correspondingly diverse set of fields and subfields in psychology and the social sciences focusing on such specific topics as racial prejudice, ingroup bias, ethnic identity, xenophobia, and nationalism. In this article, we propose a model that cuts across boundaries between these different fields to describe and explain fundamental aspects of intergroup relations.

The psychological literature in this domain comprises a vast number of empirical generalizations without an overarching explanatory perspective. This results in many ambiguities and paradoxes. For instance, belonging to a subordinate or stigmatized group is often described as intrinsically stressful, with negative health effects, but living among one's own stigmatized group sometimes has a positive impact on health (Shaw et al., 2012). Or, racism is commonly found to be associated with conservative or authoritarian values, but the supposedly

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conservative army is the one setting in the United States where people are most satisfied with interrace relations (Bullock, 2013). Or, people are considered to resent immigrants because they threaten the host population's cultural and symbolic supremacy, but when immigrants assimilate and adopt to the majority's cultural symbols, this triggers even stronger resentment in many people (Guimond, De Oliveira, Kamiesjki, & Sidanius, 2010). Many empirical findings are treated as unrelated phenomena, mostly because they are studied in distinct subfields of the social sciences. Finally, a great deal of the social psychological literature in this domain makes no connection to equally salient processes of intergroup relations studied in anthropology, human evolution, history, and economics.

We propose that many aspects of intergroup relations should be construed as different manifestations of a coalitional psychology. We describe coalitional psychology as a set of evolved mechanisms designed to garner support from conspecifics, organize and maintain alliances, and increase an alliance's chance of success against rival coalitions. In this perspective, the core psychological mechanisms are the same, independent of whether the alliance in question is formed as ethnic (based on perceived similarity and common origin), racial (based on ethnicity combined with phenotypic similarity), regional, or political, and so forth. The point of the proposed paradigm is not to discard or replace extant models or explanations but to illustrate how they can be integrated into a broader framework, which we hope will give rise to new predictions and hypotheses. Consistent with other research in evolutionary psychology (Kurzban & Neuberg, 2005; Navarrete, McDonald, Molina, & Sidanius, 2010; Neuberg, Kenrick, & Schaller, 2010; Tooby & Cosmides, 2010), we argue that whether the coalitional cognitive system is activated, and what information it processes, may provide a parsimonious causal explanation for many representations, attitudes, and behaviors in intergroup relations.

Also, we contend that intergroup relations are strongly influenced by threat-detection mechanisms. Threat detection results in the adjustment of an internal variable, the *coalitional safety index*, an individual's representation of the safety induced by membership in an alliance. The level of this variable is modulated by cues of *coalitional threat* and *support*, for example, cues of decreasing support from one's own group

or of increasing menace from rival groups. These threat cues can lead to *coalitional stress*, with standard physiological stress responses.

1. Evolved Cognition Background

1.1 Human Coalitional Psychology

Stable alliances are rare in most animal species (Harcourt & de Waal, 1992). By contrast, cooperation among non-kin toward a common goal in stable alliances is ubiquitous in human social interaction, suggesting a suite of specialized motivations and capacities that appeared during human evolution. Coalitional processes may be found at many different levels of organization, such as political parties, street gangs, office cliques, academic cabals, and bands of close friends, and can include thousands or millions of individuals when ethnic or national categories are construed as coalitions.

Coalitional psychology is a crucial element of the human capacity for collective action, in which a collection of agents cooperate toward a particular (set of) goal(s) that cannot be achieved by any single individual (or only at much greater cost); these agents behave in ways that increase each agent's welfare by making it more likely that the goal is achieved (Hardin, 1982; Myatt & Wallace, 2009). Humans for a long time have required, for their survival and reproduction, extensive support from kin but also from non-kin conspecifics, for example, in hunting (Dubreuil, 2010; Kelly, 1995), parenting (Hrdy, 1999, 2009), trade (Jaeggi & Van Schaik, 2011), and defense against other humans (Gat, 2006; Keeley, 1996). These evolutionary conditions explain why human groups are often stable and competitive. Humans need relatively stable alliances, because many endeavors require a prior assurance that support will be available when needed—warfare is a case in point. Also, human alliances may become rival even in contexts that may not require competition, because social support itself is a rival good. If an alliance builds up offering its members mutual support, it deprives others of that resource, so that one would expect coalitions to emerge as a response to the existence of other coalitions.

Collective action, as described by biologists and economists (Dugatkin, 1998; Medina, 2007; Mesterton-Gibbons & Sherratt, 2007),

requires that agents engage in highly specific information processing concerning their own and others' behaviors. For instance, (a) payoffs to other members of the group are considered as gains for self (and, obviously, negative payoffs as losses to self); (b) payoffs for rival alliances are assumed to be zero-sum—the rival group's success is our loss, and vice versa; and (c) other members' commitment to the common goal is crucial to one's own welfare. As a consequence, (a) each member monitors other members' levels of commitment, (b) there is a strong motivation to demonstrate one's commitment to the other members, and (c) there is an inclination to make defection less likely, notably by making it costly.

Participants in coalitional interactions rarely, if ever, represent these principles explicitly. All they are aware of are intuitive preferences, for instance, a desire to punish a renegade, a motivation to engage in risky behaviors for the good of the cause, an interest in whether and how far a specific person can be trusted or the fact that one's enemies' enemies can be strategic allies. Such motives and cognitions may seem self-evident to both actors and observers, and the necessary complex computations are not available to conscious inspection (Kurzban & Neuberg, 2005).

To say that there is a coalitional psychology, distinct from other mental system, does not entail that there is a demarcation between coalitions and non-coalitions in social life. First, coalitional psychology can be activated in relation to very different types of groupings—some may be based on a common category or origin (e.g., gender, ethnicity, nation) and others not (e.g., office cliques). Second, activation of coalitional psychology is in many cases contextual—an agent may treat a certain category as coalitional (e.g., the young against the old, Blacks versus Whites) in some situations but not in others. Third, one may treat a collection of agents as coalitional, while one's partners do not. The coalitional construal is in the eye of the beholder and need not align with others' construals.

When one's representations of a social category activate coalitional psychology, one (implicitly or explicitly) assumes that people belonging to that category have a greater stake in each other's welfare than they have in that of outsiders; one also assumes that they are committed to the common goal, that is, prepared to suffer some costs to advance the overall position of the alliance. This background of assumptions may

shape people's representations of group interactions in terms of common goals, potential cooperation, and indirect or direct reciprocity—the features that most explicitly influence group-oriented behavior (Balliet, Wu, & De Dreu, 2014).

1.2 Coalitional Psychology in Context: Threat-Detection Systems

Important aspects of human coalitional psychology should be understood in the context of threat detection. Natural selection results in systems that attend to recurrent danger cues in environments of evolution and guide appropriate responses (Boyer & Bergstrom, 2011; Boyer & Lienard, 2006). Survival and reproductive success require not just avoiding present danger (e.g., a predator present) but also detecting potential fitness threats (e.g., footprints indicating predator presence). Evidence from ethology, neurophysiology, and experimental psychology shows that present and potential hazards elicit different reactions and orchestrate distinct neural circuitry (Blanchard, Griebel, Pobbe, & Blanchard, 2011; Woody & Szechtman, 2011). Research on threat detection has described two features of animal threat-detection systems that are likely relevant for humans' coalitional psychology.

First, safety and threat are not two sides of the same coin (Szechtman & Woody, 2004). Threats can be inferred from the actual presence of particular cues in the environment (e.g., the smell of a predator), but the absence of predators is not usually indicated by any perceptible property of the environment. The absence of evidence is not evidence for absence. Indeed, most complex animals do not immediately infer safety from the removal of threat cues (Dielenberg & McGregor, 1999). Rather, animals' return to a baseline level of perceived security seems to be internally generated, mostly through performance of precautionary routines (Woody & Szechtman, 2011).

Second, the costs and benefits of inferring safety and threat are often asymmetrical (Haselton & Buss, 2000; Haselton & Funder, 2006; Haselton & Nettle, 2006). Individuals usually face a trade-off between false alarms (e.g., inferring the presence of a predator, when none is present) and misses (e.g., failing to infer the presence of a predator, when one is present), where false alarms are much less costly than

misses. Therefore, error management models predict that many features of social psychology are characterized by displaying false alarms—that is, by erring on the side of caution. More generally, such models explain why cues that indicate a potential reduction of safety tend to have a stronger impact on attention and motivation than cues that indicate increased safety (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001).

2. The Model

2.1 The Coalitional Safety Index is an Internal Regulatory Variable

We propose that various cues concerning potential social threats and social support are summed up as an internal regulatory variable, a *coalitional safety index*, the level of which is adjusted in each individual from situation to situation. Formally, this variable is similar to other regulatory variables proposed in the biological psychology and physiology (Tooby, Cosmides, Sell, Lieberman, & Sznycer, 2008), such as indexes for hunger or thirst (Loewenstein, 1996), overall security (McGregor, Adamec, Canteras, Blanchard, & Blanchard, 2005; Szechtman & Woody, 2004), and kinship (Lieberman, Tooby, & Cosmides, 2007). Such an index (a) integrates information from many other cognitive systems and sums them in a single value, which (b) has effects throughout the organism, such as allocating cognitive resources, modifying goal priorities, and triggering emotional and physiological reactions, and (c) predictably affects behavior (Tooby et al., 2008). Given human dependence on social support, we expect human cognitive systems to provide efficient monitoring of the availability of coalitional help. Indeed, the evidence shows that people automatically attend to alliance-relevant information in their social environment. For instance, they look for cues of reliability in potential partners by monitoring their behavior (Bacharach & Gambetta, 2001) or their faces (van't Wout & Sanfey, 2008); they seek information about others, for example, through gossip (Dunbar, 1996; Hess & Hagen, 2006; Wert & Salovey, 2004); they automatically monitor alliances among others, even among outsiders (Pietraszewski, Cosmides, & Tooby, 2014)and they carefully evaluate

the status of ongoing friendship ties (DeScioli & Kurzban, 2009; Tooby & Cosmides, 1996)

2.2 Coalitional Threat

Coalitional psychological systems, as well as delivering a representation of the social environment as composed of competing alliances, also produce inferences of danger (i.e., information likely to activate appropriate emotional systems and engage specific danger-related physiological response). Other alliances can be seen as threats both to the person (e.g., losing one's job, being attacked) and to his or her group (losing influence, power, cultural pre-eminence, and so on; (Rosenstein, 2008).

People should be able to detect both within and between-alliance threat cues. Cues suggesting that coalitional support is diminishing or absent should result in reduced levels of coalitional safety in people within an alliance (Pratto & John, 1991). Such cues include information pointing out that one's coalition partners do not consider one an actual member of the alliance, that they do not consider one sufficiently committed and trustworthy, or that they are less committed to the coalition than oneself. In situations that allow for potential physical conflict, we would expect people to be sensitive to other coalitions' number, cohesiveness, and aggressiveness, as each of these factors is relevant to the level of safety provided by one's own group (see, e.g., Schaller & Abeysinghe, 2006).

Coalitional threat cues would trigger a strong motivation to engage in a variety of behaviors to avoid the threat and return to a higher level of coalitional safety, for example, by sending clearer commitment signals, by cultivating homogeneity in the group, by avoiding members of other alliances, and by competing with or fighting against members of rival coalitions.

Threat-detection systems do not just raise a general alarm level in the face of generic danger. They typically respond in highly specific ways, in social as well as other domains. Other groups may be associated with economic or territorial competition but also with potential physical violence or with pathogen transmission (Schaller, 2006). Neuberg and colleagues have shown that these diverse kinds of threat representations

trigger distinct, appropriate emotional responses and precautionary behaviors (Cottrell & Neuberg, 2005; Schaller & Neuberg, 2012). However, on a physiological level, qualitatively different threats may evoke fairly uniform stress responses.

2.3 Coalitional Stress

Mammals have evolved two neurophysiological responses to direct challenges (Gunnar & Quevedo, 2007). One response is immediate (i.e., within seconds) and involves the fight-or-flight response; the other is a slower, more durable response (i.e., within minutes or hours) that organizes longer-term changes of behavior. The fast reactions are orchestrated by the sympathetic-adrenal medullary system, associated with activation of the sympathetic nervous system, and expressed through release of epinephrine. The slower response involves activation of the hypothalamic-pituitary-adrenal system, is associated with parasympathetic activation, and results in the release of glucocorticoids (cortisol in humans). Repeated activation of these responses results in chronic stress, with important consequences for health and well-being (Sapolsky, 2007).

A crucial part of our model is that the detection of coalitional threat cues in one's social environment triggers a stress response. Repeated exposure to such cues may lead to chronic stress, which in turn yields negative health consequences. Therefore, to the extent that many individuals in a specific social category are exposed to similar coalitional threats, we should expect these effects to translate into differences in health outcomes at the level of social groups.

2.4 Specific Computations

In the model proposed here, many aspects of intergroup psychology are construed as domain specific, geared to the management of coalitions. This stands in contrast to some classical models of social affiliation in terms of broad, domain-general processes, such as stereotyping, preference for familiarity, motives for distinct identity, or desires for self-esteem (see 'Integrating Classical Frameworks' later in this article). We propose that specialized cognitive systems orient attention to specific information relevant for computing coalitional

safety and threat. In the course of everyday life, people are constantly sampling their social environment and automatically making inferences about properties of that environment. For instance, perception of the numbers of immigrants in one's country is heavily influenced by the number of visibly 'foreign' individuals encountered (Center, 2006). For the purpose of making inferences about coalitional safety and threat, we expect coalitional psychology to focus on such information as the number of individuals in one's coalitions, the number of individuals in other perceived coalitions, changes in those numbers, the perceived aggressiveness of these coalitions, their cohesiveness, and their respective members' commitment, strength, and so on. The model predicts that these inferences regarding coalitional safety and threat result not in unspecified positive or negative affective states but in domain-specific affective states that motivate a limited set of courses of action, appropriate for coalitional purposes.

We summarize the model in Figure 1. Below we survey a number of well-known aspects of intergroup relations and describe how they can be understood in terms of cues that increase or decrease the coalitional safety index.

3. Intergroup Encounters as Threat Cues

We start with the individual impact of intergroup encounters. In the short survey that follows, we emphasize how a coalitional appraisal system integrates various cues and as a result adjusts the coalitional safety index.

3.1 Association between 'Outgroups' and Danger

The literature on the association between outgroups and danger is vast but essentially convergent, suggesting that this relationship is implicit and largely automatic, resulting in an 'avoidance' rather than 'approach' motivation (Paladino & Castelli, 2008). For example, when primed with faces of Black men, American subjects expect weapons rather than tools (Payne, 2001; Payne, Lambert, & Jacoby, 2002). People categorized as potential enemies seem physically stronger than controls (Fessler & Holbrook, 2013), whereas being in the company of friends

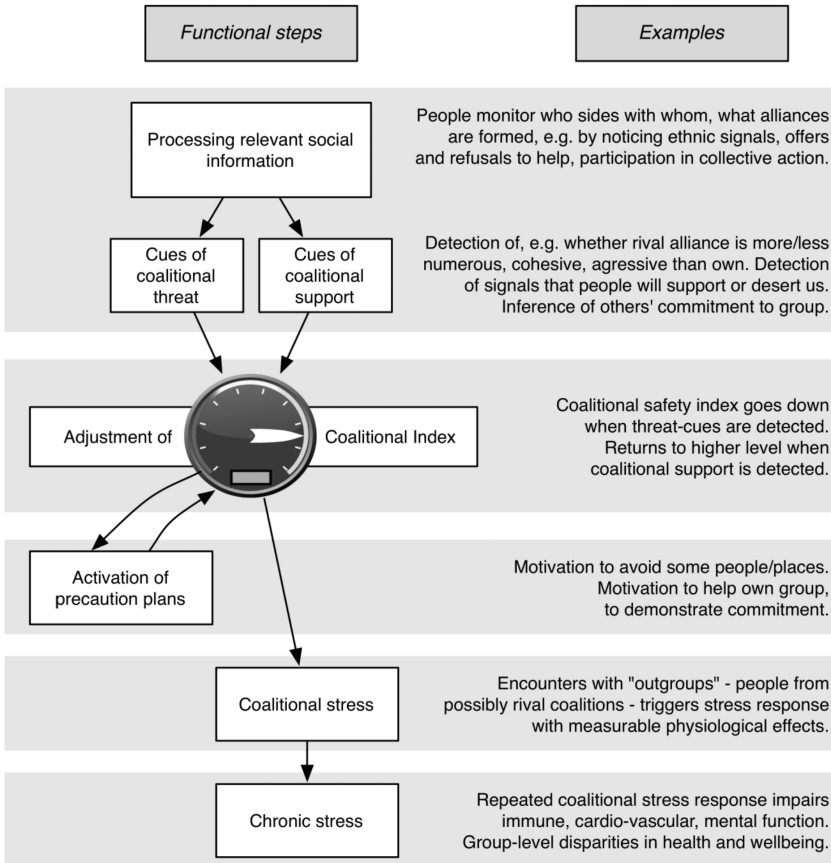

Fig. 1. Schematic representation of functional processes involved in the adjustment of the coalitional safety index (left) and examples of such processes (right). The model describes how attention to social information, for instance, about people's behaviors indicating affiliation, leads to inferences of social threat and social support. These inferences modulate the coalitional safety index, which has two main consequences. First, it changes motivations concerning action plans, for instance, an effort to remain within one's group, to avoid others, or to boost solidarity in one's own group. Second, lowering the coalitional safety index triggers a stress response, which can have adverse long-term consequences. (Figure design by P Boyer. 2015).

makes potential enemies seem physically smaller (Fessler & Holbrook, 2013). Fear is more easily attributed to out-group than ingroup faces (Navarrete et al., 2009), even when participants were assigned to minimal groups—artificial groups construed for the purpose of the experiment based on an arbitrary criterion (Navarrete et al., 2012). Encounters with

outgroups are experienced as uncertain and demanding (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001), often create a specific form of 'intergroup anxiety' (Stephan & Stephan, 1985), and are associated with an increase in behaviors like blinking and fidgeting (Fazio, Jackson, Dunton, & Williams, 2008). Neuroimaging studies have also demonstrated specific fear-circuitry activation in response to stimuli depicting outgroups (Hart et al., 2000). Why are outgroups implicitly and often explicitly perceived as potential danger? This association is often explained in terms of shared stereotypes about social categories. In this view, encounters between Blacks and Whites in the United States, for example, are stressful because of a White stereotype of Blacks as violent and a Black expectation of White racism. However, it is not parsimonious to explain each case of difficult intergroup contact in terms of specific cultural stereotypes, as they occur even with minimal groups for which there are no stereotypes and more generally because the phenomenon is ubiquitous and thus demands a general explanation. Indeed, most people in most cultures known to history and anthropology have expected intergroup relations to be fraught with danger or at least some measure of hostility (Gat, 2006; Keeley, 1996). The notion of 'others' as threatening is an essential component of the ethnocentric prejudice generally observed in human societies (LeVine & Campbell, 1972).

3.2 Categories Tacitly Construed as Coalitions: Race in the United States

In our model, what drives people's intuitions about members of some social category as potential danger is not (just) information about characteristics of that category but the specific inference that members of that category are a coalition, that they are striving to achieve common goals against other alliances, including their own.

Consider interracial encounters in the United States. Usually, race is automatically encoded by American participants, regardless of protocols and task demands. However, 'race' is unlikely to be part of our evolved conceptual repertoire, because encounters with people of visibly different ancestry are a recent phenomenon in terms of evolutionary history (Cosmides, Tooby, & Kurzban, 2003). These encounters did not occur regularly before efficient modes of long-range transportation were

invented. Excluding a long-evolved adaptation to interracial encounters, one possible interpretation of automatic race encoding is that it is simply a byproduct of general perceptual biases. A more plausible alternative is that race, in the United States, is a proxy for coalitional affiliation. To demonstrate that, Kurzban, Tooby, and Cosmides (2001) used a memory-confusion paradigm in which they presented participants with different target faces, together with text suggesting that two coalitions were involved in a conflict. Each of the suggested alliances crossed racial categories. As predicted, this manipulation resulted in significantly less accurate memory for race than in conditions without such coalitional cues (Kurzban et al., 2001), showing that retrieving coalitional affiliation interfered with race but not with other distinctive features like gender. In other words, current coalitional concerns and external cues can easily interfere with encoding or retrieval of racial categories, because they activate the same cognitive systems (Pietraszewski, 2009). The automatic encoding of racial categories, then, is not a simple matter of perceptual cues but requires a conceptual elaboration of these cues as a proxy for coalitional rivalry, which is a specific consequence of the U.S. social history (Cosmides et al., 2003). This coalitional interpretation also makes sense of other empirical results concerning Black–White encounters. For instance, automatic race encoding is stronger when perceiving lower-class Blacks than when perceiving middle-class Blacks (Weeks & Lupfer, 2004), presumably because lower-class Blacks are seen as more hostile than middle-class Blacks by most research participants. Also, gathering participants into mixed-race minimal groups interferes with the familiar phenomenon of racial ingroup bias (Van Bavel & Cunningham, 2009).

3.3 Intergroup Encounters and the Stress Response

As outgroups are associated with hazard, encounters with them trigger physiological processes appropriate in the face of potential danger, a process that is crucial to understanding the cognitive effects of intergroup relations (Blascovich et al., 2001; Page-Gould, Mendoza-Denton, & Tropp, 2008). Specific cardiovascular responses may result from unexpected and limited physical contact with an unfamiliar outgroup (Vrana & Rollock, 1998) or from imposed dyadic interaction

with outgroup members (Littleford, Wright, & Sayoc-Parial, 2005). Such cardiovascular reactions are modulated by cognitive appraisal of the situation. For instance, White participants' physiological reactions during dyadic interaction are modulated by the self-description of Black interaction partners (confederates) as advantaged or disadvantaged (Mendes, Blascovich, Lickel, & Hunter, 2002). Also, uncertainty about another's attitudes and intentions is a major contributor to the physiological response. In one study, responses of both Black and White participants to negative evaluations depended on the race of the evaluator and triggered threat reactions only when the evaluator was of the same race. Positive evaluations tended not to trigger threat reactions, except when they contradicted stereotypes. Whites may expect positive evaluations from both Whites and Blacks, and Blacks may expect positive evaluations from Blacks. But Black participants likely expected negative evaluations from Whites and responded to 'suspicious' positive evaluations by Whites with an increased threat response (Mendes, Major, McCoy, & Blascovich, 2008). Such responses are also observed as reactions to merely anticipated interracial encounters, as measured in both cardiovascular responses (Sawyer, Major, Casad, Townsend, & Mendes, 2012) and subjective ratings of health (Page-Gould, Mendoza-Denton, & Mendes, 2014).

These effects of intergroup contact are best understood in terms of an intuitive appraisal of the resources available to each partner (Blascovich et al., 2001). Cognitive, emotional, and physiological responses to intergroup encounters engage both a primary appraisal (to evaluate potential danger) and a secondary appraisal of one's own resources, leading to a coping versus stress polarity, which in turn results in either engagement or antagonizing behaviors (Trawalter, Richeson, & Shelton, 2009).

Stress is a response to situations appraised as incompatible with an organism's goals (Lazarus, 1984). So understanding stress responses requires that we identify the appraisal system involved (Smith & Kirby, 2011). We propose that the coalitional safety index constitutes precisely such an appraisal. Stress responses would make little functional sense if people were confronted only with instances of stereotypes. For instance, the fact that one's partner in an experimental dyad comes from a group reputed to be incompetent should not impair one's own

performance or result in a specific cardiovascular response. By contrast, if that encounter is implicitly framed as potential danger, the response is clearly functional.

4. Coalitional Stress and Health

We should expect repeated exposure to stressors, in the coalitional domain as elsewhere, to result in chronic stress with observable physical and mental health consequences.

4.1 Minority–Majority Health Disparities

The world over, immigrants and minorities suffer from worse health than host or majority populations (D. R. Williams, 2012). In many cases, obviously, immigration is confounded with oppression, poverty, or trauma from exile. However, the pattern also obtains in settled immigrant communities, such as Latinos in the United States (Osypuk, Bates, & Acevedo-Garcia, 2010) or South Asians in Britain (Carpenter & Brockington, 1980). Such negative impact of emigration on health sometimes leads to the 'immigrant paradox' whereby foreign-born members of these groups fare better than those born in the host country (Alegría et al., 2008). Health disparities between immigrant and host populations can be observed in virtually all modern industrial societies with large migrant groups (Bak-Klimek, Karatzias, Elliott, & Maclean, 2014; Noymer & Lee, 2013)

A similar disparity is observed between low-status social categories and the rest of the population. For instance, racial-minority members in the United States get sick more often, die at younger ages, and have more hypertension and lower levels of subjective well-being than Whites (Geronimus, Bound, Waidmann, Hillemeier, & Burns, 1996; D. R. Williams, 2012). Though there are exceptions to this pattern (Morales, Lara, Kington, Valdez, & Escarce, 2002), it seems that in general, native ethnic and racial minorities fare worse on various health outcomes and rate their well-being lower than non-minorities.

Part of this disparity stems from economic conditions, such as access to nutrition, type of work, and access to healthcare (Lynch, 2000). However, the differences persist even after controlling for these factors,

suggesting that discrimination as such has a general deteriorating effect on health (Mays, Cochran, & Barnes, 2007; Pascoe & Smart Richman, 2009). The poor health outcomes for minorities and stigmatized groups may result from a range of social processes, including categorization, hierarchical ranking of groups, and perceived levels of achievement or competence (Major, Mendes, & Dovidio, 2013).

Stress is generally recognized as the crucial causal link between discrimination and health (Major et al., 2013; D. R. Williams & Mohammed, 2009). Perceived discrimination tends to elevate physiological stress responses such as blood pressure, cardiovascular reactivity, and heart rate (Brondolo, Rieppi, Kelly, & Gerin, 2003; Guyll, Matthews, & Bromberger, 2001; Utsey & Hook, 2007). Epidemiological studies support this stress-based explanation for Blacks in the United States (Clark, 2000; Clark, Anderson, Clark, & Williams, 1999) and for ethnic minorities more generally (McEwen, 2004; McEwen & Stellar, 1993). Even merely anticipated discrimination can produce stress (Karlsen & Nazroo, 2004). That discrimination causes stress explains why the greatest health disparities between minority and majority groups is found in conditions typically brought about or worsened by chronic stress, such as obesity, heart disease, and hypertension (Geronimus et al., 1996).

A similar process may be responsible for deteriorated health among immigrants, as 'acculturation stress' accumulates in individuals confronted with new values or norms (C. L. Williams & Berry, 1991). The connection between acculturation and stress has been observed among Asian immigrants in the United States (Chung & Epstein, 2014), Latino students (Cano, Castillo, Castro, de Dios, & Roncancio, 2014), and older adults (Kwag, Jang, & Chiriboga, 2012). Indeed, newly arrived Latino immigrants in the United States enjoy a health advantage (in terms of adverse effects of chronic stress) over the rest of the Hispanic population, which decreases with each decade spent in the United States (Kaestner, Pearson, Keene, & Geronimus, 2009).

In a survey of health disparities, Major and colleagues reviewed a variety of factors (stereotype threat, excessive vigilance, memories of injustice, attributional ambiguity, and many more), all of which are documented as contributing to stress responses (Major et al., 2013). In summary, there is overwhelming evidence that, in many different ways,

the experience of minority or immigrant individuals includes a frequent occurrence of stress-inducing episodes, more so than for host or majority populations (Contrada et al., 2000, 2001).

4.2 Ethnic Density Effects

There is an interesting exception to general health disparities between majority and minority groups: the *ethnic density* effect. This effect refers to the situation when immigrants or members of minorities who live among other members of their group fare better than those who live among the majority population. This effect is counterintuitive, as immigrant or minority neighborhoods are generally poorer, less pleasant, and afford less access to health resources.

Ethnic or group density effects were first observed in the domain of mental health (Bosqui, Hoy, & Shannon, 2014; Halpern, 1993; Shaw et al., 2012). For instance, British Asian immigrants in more homogeneous environments have a lower incidence of psychoses (Boydell et al., 2001; Das-Munshi et al., 2012; Das-Munshi, Becares, Dewey, Stansfeld, & Prince, 2010) and other pathologies like self-harm (Neeleman, Wilson-Jones, & Wessely, 2001). In the United States, the effects of acculturation on depression are modulated by group density among Latinos (Kwag et al., 2012).

Ethnic density also influences general health outcomes (Becares & Nazroo, 2013; Pickett & Wilkinson, 2008). For example, birth weight among U.S. Latinos is higher in mostly Latino neighborhoods (Osypuk et al., 2010); Black mortality from cardiovascular conditions is higher in more mixed neighborhoods in New York (Fang, Madhavan, Bosworth, & Alderman, 1998).

There is no consensus explanation for such density effects and surprisingly little systematic hypothesis testing about its causes (Shaw et al., 2012). Density may correlate with better social integration—that is, each individual has more and better social ties in homogeneous places (Pickett & Wilkinson, 2008). However, it is not clear that social capital mediates the density effect (Becares & Nazroo, 2013). An alternative is that ethnic density provides 'buffering' against the social psychological effects of discrimination (Becares & Nazroo, 2013). Living in an ethnically homogeneous place may decrease the psychological weight

of stigma (Pickett & Wilkinson, 2008). Assuming that this is the case, we still have no precise functional description of the processes whereby stigma or, conversely, protection from stigma would result in specific health outcomes.

4.3 Coalitional Interpretation

A proper explanation of the effects of intergroup relations on health should account for both the overall disparity between groups and the interaction with ethnic homogeneity. Explanations in terms of societal phenomena like stigmas or shared stereotypes may not provide a sufficiently specific description of the psychological and physiological processes involved.

We propose that the coalitional safety index is affected by a variety of threat cues, including the absence of individuals willing to extend support, decreases in number of such individuals, the presence of members of rival groups, their number, an increase in their number, their perceived level of hostility, and their perceived capacity to inflict harm. In other words, the perception of coalitional safety is influenced not just by activated beliefs about one's own and other groups but also by inferring probable states of the world from such features as relative numbers, frequencies of encounters, and tenor of interaction.

The daily experiences of minorities or immigrants, on the one hand, and majority or host populations, on the other, diverge on these elementary metrics. First, even assuming an equal level of perceived danger in all intergroup encounters and all else being equal, minority individuals are bound to encounter majority individuals more frequently than vice versa. Second, in these encounters, minority members are more likely than majority individuals to appraise the situation as one of weaker coalitional position. For minority individuals, each encounter with majority members potentially constitutes a threat cue, in that it reminds the minority person that he or she is a member of a less numerous and probably weaker group. So even in terms of low-level properties of the social environment, the natural sampling described above should result in a higher frequency of stressors (i.e., a higher number of situations in which the coalitional safety index is down-regulated, if only momentarily).

Such an information-processing account also explains the ethnic density effect. Living in ethnically homogeneous neighborhoods changes the base rates of encounters with same- and rival-coalition members, thus reducing the number of stressors. One would expect that the cumulative, chronic stress effect is therefore smaller for minority individuals living in homogenous neighborhoods. Our interpretation predicts that this beneficial effect of homogeneous neighborhoods may be diminished if an individual does not perceive the frequent own-ethnicity encounters as interactions with coalitional allies. Indeed, people of very low status in their communities do not benefit from ethnic homogeneity (Ayers et al., 2009; Cano et al., 2014; Chae, Park, & Kang, 2014).

5. Integrating Classical Frameworks

Beyond providing explanations for consequences of intergroup contacts, the coalitional model may also help us integrate some standard perspectives on intergroup relations. Specifically, we consider here distance and con-tact approaches, social identity perspectives, and finally social dominance theory.

5.1 Intergroup Contact and its Paradoxes

We argue that some aspects of intergroup relations should be explained in terms of the psychological processes involved in individual encounters with outgroups. That is also the starting point of the various hypotheses put for-ward in the 'contact' tradition (Dovidio, Gaertner, & Kawakami, 2003), which aims to reduce the prevalence of negative stereotypes and attitudes about outgroups by increasing the frequency and quality of encounters with outgroup members (Thomas F. Pettigrew & Linda R. Tropp, 2006).

However, generalizing this association between more contact and more positive relations would be clearly difficult. Places of high outgroup fear and rejection, like the antebellum South in the United States or apartheid South Africa, were also places of intense, daily contact and deep familiarity between dominant and dominated individuals. That is why the contact literature emphasizes that increased intergroup contact diminishes prejudice only if the persons concerned are equal

in status, have common goals, are not in competition, and the contact is sanctioned by authority (Pettigrew, 1997; Thomas F Pettigrew & Linda R Tropp, 2006).

These conditions for beneficial contact show that the benefits depend on coalitional cooperation, which would raise the coalitional safety index in the individuals in contact. People from different social categories may find that categories matter little when they are equal partners in a joint collective action.

A case in point is the U.S. military, which started integrating all its units in 1948. Decades later, U.S. military personnel report levels of satisfaction with intergroup personal relations far above those of civilians (Bullock, 2013). Shortly after the start of the integration process, the units with higher numbers of minority (Black) soldiers reported greater satisfaction than others with interracial relations (Moskos, 1966). This increased satisfaction in heterogeneous units would seem to support the contact hypothesis. But note that the military is a very special social environment, as it constitutes in many ways a situation of coalitional affiliation. Military units are explicitly described as alliances against enemies. In small units like platoons, the specific coalitional dynamic of race is replaced with another one, in which individuals of all categories engage in a high-stakes collective action. Consistent with this interpretation, the beneficial outcomes of army integration change with contexts. Although prejudice is lowest in combat units in times of combat and in dangerous places, it tends to increase in times of peace and in civilian life, when the individuals of different ethnicities are no longer members of the same coalition (Bullock, 2013).

Conversely, the coalitional perspective makes sense of the fact that contact does not reduce prejudice or rejection in situations in which individuals from different categories cannot engage in mutually advantageous collective action, because of institutional or other barriers, as was the case for Blacks and Afrikaners in South Africa (Korf & Malan, 2002). More generally, coalitional dynamics explain why, in contrast to the original formulations of contact theories, intense or frequent intergroup contact can be detrimental. As in the context of health outcomes, intergroup encounters are stressors before they are construed as situations of collective action.

5.2 Limits of Social Identity Interpretations

Safety and threat dimensions of intergroup contact are addressed only indirectly in the framework of social identity theory, self-categorization theory, or what could be called more generally the social identity approach (Hornsey, 2008). Developed on the basis of minimal groups studies in the 1970s and 1980s (Tajfel & Turner, 1986), this approach has been applied to group polarization, group solidarity and cohesiveness, stereotyping, crowd violence and rioting, social influence, conformity, and power. A starting point of this framework is that people are motivated to engage in intergroup competition and other strategies in order to protect and/or promote a positive and secure self-concept (Brewer, 1979). Self-esteem or maintenance of a coherent sense of self are postulated as primary drives, which, combined with comparative assessment, lead people to hold representations of their own and other groups (stereotypes) with associated valence (attitudes) (Hornsey, 2008).

One clear limit of social identity approach lies in justifying these general conjectures. That is, even though intergroup attitudes may be connected to self-concepts, it is not clear why maintaining a positive or 'secure' self-concept would be a fundamental human motivation and through what evolutionary process this could have become a general human need. Moreover, the notion of people choosing among a variety of available identities in the service of maintaining a self-concept is clearly confined to some modern mass societies. It would be irrelevant in places where identity is assigned by genealogy, like most societies in human history.

Even as a descriptive framework, social identity theory has difficulties integrating some common aspects of intergroup relations. A good example is that of immigrant assimilation. From the standpoint of social identity theory, immigrants' adoption to the host population's cultural norms should be seen by members of the latter population as clearly positive, as it reinforces the assumption that these norms are superior. However, that is far from being the case. Studies carried out in the United States, Sweden, and France observed two divergent paths. Some individuals were hostile to cultural differentiation and therefore to immigrants holding on to cultural and ethnic markers. By contrast,

others were hostile to immigrants' assimilation, which they saw as a menace. These attitudes correlate with different personality orientations. High authoritarianism predicts the rejection of cultural differentiation. High preference for hierarchical intergroup relations predicts rejection of assimilation (Guimond et al., 2010; Thomsen, Green, & Sidanius, 2008). These two variables account for the two contrary attitudes to assimilation, and neither of them is influenced by the need for a positive and coherent self-concept.

More generally, the connection (in a limited number of modern Western societies) between identity and self-esteem may be more economically interpreted as an effect of fundamental psychological processes. People are motivated to join groups, build them, and maintain them because of the safety and support provided by membership. They are motivated to describe their group as superior because (among other things) this signals to other members their commitment to the group. Safety and signaling motivations are established by independent evidence and have a long evolutionary history. They provide a more parsimonious explanation than self-esteem motives for intergroup dynamics.

5.3 Social Dominance Orientation and Coalitional Investment

Research on social dominance theory (Sidanius & Pratto, 1999) has anticipated some of the hypotheses presented here. Social dominance theory also starts from the observation that most intergroup relations are competitive and emphasizes that humans readily construe hierarchical intergroup relations on arbitrary bases (i.e., not based on age or sex). Also convergent with the coalitional perspective, social dominance theory implies that stereotypes and attitudes are the effect rather than the cause of discriminatory behaviors. As Guimond et al. put it, '[social dominance] theory conceptualizes prejudice as a form of hierarchy-enhancing legitimizing myth, an ideology that justifies intergroup inequality' (Guimond et al., 2010). Such a conceptualization of prejudice is consistent with the notion that stereotypes are explanations rather than descriptions of the social environment (McGarty, Yzerbyt, & Spears, 2002; Yzerbyt, Rocher, & Schadron, 1997). In our perspective, stereotypes are tools used to explicate and communicate to others the

contents of one's intuitive expectations about other individuals, for example, that they are in some alliance and constitute a potential danger.

Regarding the psychological variables involved, social dominance theory postulates the personality variable of social dominance orientation (SDO), measuring the extent to which people are motivated to preserve and reinforce the subordination of some social groups (Pratto, Sidanius, Stallworth, & Malle, 1994; Sidanius, Pratto, & Bobo, 1994). The SDO measure predicts a number of attitudes and motivations associated with intergroup differentiation and contact (Guimond et al., 2010; Pratto et al., 1994; Sidanius et al., 1994; Thomsen et al., 2008).

We propose to interpret SDO as one of the stable personality factors contributing to the coalitional safety index. SDO may be a measure of (a) the extent to which individuals construe a particular category as a collective action they are part of, so that they perceive their welfare as dependent on the welfare of the group; and (b) the extent to which they are willing to invest in defending coalitional interests, which would in turn motivate them to preserve group boundaries. Returning to the example discussed above, this may provide an explanation for the association between high SDO and rejection of assimilation. Immigrants' assimilation constitutes a threat because it dilutes the benefits of membership in a dominant group and because it makes member identification more difficult (uncertainty about affiliation increases transaction costs in collective action and creates opportunities for free riding). Blurring of the boundaries between national categories would be perceived as costly and therefore rejected most strongly by those who have construed national categories as coalitions and have invested heavily in this coalition.

6. Implications

We have argued that the coalitional safety index model provides an integrated and parsimonious understanding of safety, threat, and stress in intergroup relations. The model also suggests directions for further investigation.

6.1 Coalitional Cues: Microprocesses of Social Sampling

In the social science literature, people are often described as experiencing social phenomena as large societal entities. For instance, immigrants are said to be directly affected by the host population's xenophobia. Models of 'racism as stressor' simply assume that negative stereotypes and attitudes toward one's own group will trigger stress responses (Lewis-Coles & Constantine, 2006). The connections are clear but lack an explanation. The coalitional perspective provides such an explanation, as indices of racism, negative attitudes, and so forth are construed as reminders of one's coalitional vulnerability. So, for example, it is not racism as such that is stressful but the easy inference from putative racism to one's reduced safety.

Our model emphasizes the microprocesses involved in computing one's coalitional safety index and suggests specific hypotheses about these processes. A system that computes coalitional safety should attend to various cues of the safety provided by one's own coalition and the threat posed by rival coalitions. As mentioned above, such microprocesses may provide a causal understanding of observed connections between anticipated discrimination and stress, minority status and stress, and ethnic density and relative immunity from stress.

We would expect that people's reactions to an immigrant group might be affected by general information about that group's size but also by the frequency of actual encounters with immigrant individuals. The model also predicts that people should attend to the cohesiveness of coalitions, whether members of a coalition act in concert toward a common goal, which may result in lower coalitional safety when one infers one's own coalition to be weaker (or in higher coalitional safety when one infers one's own coalition to be stronger). Cohesiveness cannot really be observed; it must be inferred, for instance, from the similarity (in dress, speech, behavior) of the coalition members.

In short, the coalitional perspective suggests that further exploration of intergroup dynamics should pay special attention to the cognitive processes whereby people automatically sample their social environment and infer underlying properties on the basis of that sampling. This research program would benefit from cognitive psychology findings and models concerning intuitive statistics, 'fast and frugal heuristics,' and other aspects of ecological rationality (Gigerenzer, 2007).

6.2 Gender Differences

Human dispositions and capacities are shaped by what worked toward reproductive success, on average, in evolutionary conditions. This provides a starting point for investigating and explaining gender differences in coalitional psychology.

In standard social psychological models, there is little reason to expect, and generally no explicit predictions of, differences between men and women regarding inter-group processes. By contrast, an evolutionary perspective predicts profound sex differences, as already emphasized in social dominance theory (Sidanius et al., 1994). Through most of human evolution, groups were patrilocal, as men stayed and women moved between groups (Pasternak, Ember, & Ember, 1997; Seielstad, Minch, & Cavalli-Sforza, 1998). Women had to establish support networks with non-kin (Taylor et al., 2000), while men needed to bolster alliances between kin groups to compete with other coalitions (Kaplan, Hill, Lancaster, & Hurtado, 2000), most clearly in tribal warfare, an almost exclusively male (Gat, 2006; Keeley, 1996). As predicted, different patterns of socialization can be found cross-culturally from early childhood (Geary, 2003).

As a consequence, we may expect men to be more motivated than women to see interindividual relations in terms of rival coalitions and more motivated than women to engage in violent coalitional strife; both men and women should be biased toward representing coalitional enemies as typically male. Some psychological evidence supports these conjectures. For instance, after threat priming, men are more likely than women to activate concepts of groups and coalitions (Bugental & Beaulieu, 2009). Women cooperate within a group regardless of competition with rival groups, while rivalry makes men more cooperative inside the group (van Vugt, Cremer, & Janssen, 2007). Men are implicitly biased to see men more than women as enemies (Plant, Goplen, & Kunstman, 2011). In both genders, the association of anticipated harm with a male's face is more difficult to extinguish than the association with a female face (Navarrete et al., 2009).

Sex differences in coalitional psychology may also account for the effects described by Sidanius and colleagues in terms of a *subordinate male target* hypothesis. According to this hypothesis, which is supported

by many empirical studies, adult men of the dominated group are the focus of more intense discrimination than women (Sidanius & Pratto, 1999). One possible explanation for this phenomenon is in terms of the potential reproductive value of subordinate women, which would palliate discriminatory attitudes toward women (Sidanius & Pratto, 1999). Further developments of social dominance models point to a simpler and broader explanation, that men are the target because group rivalry recruits mental systems that evolved in the context of tribal warfare, in which males are more likely than females to be aggressors (McDonald, Navarrete, & Van Vugt, 2012; Navarrete et al., 2010; Yuki & Yokota, 2009).

6.3 Coalitional Effects beyond Minorities

The literature reviewed above describes the poor health outcomes of subordinate groups (controlling for confounding socioeconomic variables) as an effect of prejudice, stereotype, or discrimination. The coalitional model by contrast emphasizes the number of encounters with individuals of a rival coalition, especially if these rival coalitions are perceived as stronger, more numerous, increasing in number, or more cohesive than one's own. A prejudice model would not predict that members of majorities experience a negative health impact when an ethnic minority in their neighborhood increases in number or visibility. By contrast, the coalitional perspective predicts that increasingly frequent encounters with people of a rival coalition (the minority), especially when the minority is apparently cohesive (e.g., inferred from displays of common markers, a distinct unfamiliar language, and so on), would increase the number of stress responses in majority individuals.

Note that such negative effects on majority individuals have already been observed in another domain, that of trust. In studies by Putnam and others, generalized social trust (the extent to which one thinks one can trust others in one's social environment) decreases with greater ethnic diversity (Putnam, 2000, 2007). Further studies have shown that this effect depends on the frequency of encounters at the level of small neighborhoods (Dinesen & Sønderskov, 2012). Our coalitional stress model would predict that this may have effects on health as well. There is some evidence in that direction—for example, Whites who live in more

homogeneous neighborhoods have better health in New York (Fang et al., 1998) and fewer psychiatric admissions in Chicago (Halpern, 1993). But the data are really sparse, and only largescale surveys could overcome the obvious confounds created by the overall inequality between majority and minorities, as well as potentially harmful effects of majority individuals' own prejudices.

7. Conclusion

The proposed model stipulates that an internal regulatory variable, the coalitional safety index, corresponds to an individual's perceived coalitional security. The index reflects the extent to which he or she can depend on others in the competition against other alliances. It is down-regulated by specific threat cues of reduced support from one's own coalition or increased menace from a rival coalition, which trigger motivations for appropriate precautionary behaviors. Repeated perceptions of such threat cues may cause chronic stress, with negative health consequences.

This perspective allows for the explanation of a great variety of phenomena described in the social psychology of intergroup relations, such as stereotyping, racism, ethnocentrism, stress, and health disparities, in terms of a suite of capacities and motivations shaped by natural selection. The evolved human coalitional psychology is described as a set of universal systems that take as their input specific information about the social environment and activate appropriate motivations to maximize coalitional safety. Interactions between such systems and highly variable social conditions result in culturally and historically specific representations of the social world, which motivate equally specific attitudes and behaviors.

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