

because research has indicated that general trust in others is weaker in countries closer to the equator (e.g., Balliet & Van Lange 2013; Robbins 2015). Furthermore, we noted earlier that pathogen stress contributes to the harshness of countries closer to the equator (e.g., Guernier et al. 2004). However, pathogen stress is also closely associated with tendencies toward collectivism, including tendencies to think and act to protect and serve the immediate social group rather than the entire collective (e.g., ethnocentrism [Fincher et al. 2008]). A strong, prosocial orientation to one's own group often can be at conflict with other groups, especially when resources are scarce. For example, when deciding on the route of noisy planes, individuals and groups may lobby or protest in favor of their own community and seek rerouting of the planes so that they fly over communities other than their own. This line of reasoning also helps illuminate why climate is more strongly related to intergroup conflict than to interpersonal conflict.

6. Concluding remarks

Several useful theories have been proposed to explain differences in aggression and violence between those who live in warmer and colder parts of a country or the world. These include the General Aggression Model (Anderson & Bushman 2002), Routine Activity Theory (Cohen & Felson 1979), and Culture of Honor Theory (Nisbett & Cohen 1996). The purpose of CLASH is not to replace these theories, but rather to offer another possible explanation of these relatively large differences in aggression and violence between and within countries around the world. CLASH focuses on differences in average temperature and seasonal variation in temperature as two key climate variables that account for differences in aggression and violence, and it reserves key roles for fast and slow life strategies, time orientation, and self-control.

CLASH helps account for differences in aggression and violence both within and between countries, regardless of the size of those countries. It is a society-level model that uses differences in the climate (a key aspect of the "physical" environment) as a starting point and then bridges psychological processes within individuals (emphasizing life strategy, time-orientation, and self-control) with social processes and outcomes at the level of groups, cultures, and societies. Most past theories of aggression and violence tended to focus on psychological process or societal differences. Thus, we believe that CLASH provides a logical and internally consistent theoretical framework that integrates psychological processes and societal differences that have evolved and ultimately are rooted in geographical locations that underlie strong differences in climate.

Although the merit of CLASH is primarily theoretical, we close by outlining some important implications for society. Assuming CLASH is accurate, it is interesting to consider that people's thoughts and behaviors may differ based on the physical circumstances their ancestors faced and that they themselves face. The world is getting smaller and smaller. Electronic and social media (e.g., WhatsApp, Twitter, Facebook, email) connect us to people all over the world. Yet people coming from differing ancestral histories and living in different locations face challenges of self-control in a variety of ways. A businessperson

from London may expect a response the next day, but the alliance in Nairobi may want to take at least an extra day. If CLASH is correct, the same pattern should hold for within-country differences between a businessperson working in Chicago and the alliance working in New Orleans, or between a businessperson working in Melbourne and the alliance in Brisbane or Cairns (with London, Chicago, and Melbourne being relatively more remote from the equator and facing greater variation in climate). Although people may have an implicit or even explicit understanding of some cultural differences in time orientation and self-control, it is likely that such differences may contribute to misperceptions and misunderstandings in cross-national communication. This is important because a perceived lack of self-control may pose a serious threat to interpersonal trust, even in ongoing relationships.

The implications of cross-national communication processes are potentially far reaching, and may help illuminate challenges and problems in business transactions, in international negotiations about climate change, and even in many interactions between Northern Europeans and the refugees coming from various countries closer to the equator (e.g., Syria, Afghanistan, Somalia). Turning back to within-country variation, consider the regional differences in attitudes and communication styles even within such a (large) country as the United States (e.g., Andersen et al. 1990; Nisbett 1993). Because communicating "honor" is especially important to people living in the South of the United States, it seems advisable to adopt a respectful style of communication for business and effective negotiation with individuals from these states. Reserving judgment and giving the benefit of the doubt is probably an effective mindset, because provocation may be more quickly elicited in individuals from Southern states than in individuals from Northern states and, once elicited, more quickly translate into aggression and perhaps even violence. According to CLASH, these differences are ultimately rooted in climate differences and therefore should be relevant to understanding important differences in aggression and violence among many countries around the world.

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Dimensions of environmental risk are unique theoretical constructs

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Abstract: Life history theory serves as the foundation for the CLimate, Aggression, and Self-control in Humans (CLASH) model of aggression. However, this model embodies several misunderstandings of life history constructs and principles. The CLASH model does not recognize that environmental harshness and environmental unpredictability are unique

theoretical constructs, rendering predictions and implications from the model suspect.

Life history theory is a theoretical framework for addressing how and why organisms, including humans, allocate resources to conflicting life tasks (Del Giudice et al. 2015; Roff 2002; Sterns 1992). Life history theory is complex and rich in its predictions but is often oversimplified when applied to human psychology and behavior. Van Lange et al. (2016) also present an oversimplification of life history theory as the foundation for the CLASH model proposed to explain aggression and violence across the world. In particular, the model incorrectly specifies how environmental harshness and unpredictability affect life history strategies and behavioral outcomes. Here, we discuss three misunderstandings of life history theory expressed in the target article.

First, the CLASH model appears to conflate the constructs of environmental harshness and environmental unpredictability into a single predictor of individual variation in life history outcomes (e.g., aggression). The model correctly identifies that both environmental harshness and environmental unpredictability function to regulate life history strategies. The model incorrectly implies, however, that harshness and unpredictability are dependent constructs. Ellis et al.'s (2009) dimensions of environmental risk – harshness and unpredictability – are independent constructs that exert *unique* influences on individual variation in life history strategies. The CLASH model of aggression specifies that environmental harshness and environmental unpredictability determine the overall stress of the environment. In turn, this overall environmental stress is predictive of aggression. Environmental harshness and environmental unpredictability can be positively associated, such that a given environment can be harsh *and* unpredictable. The CLASH model, however, does not account for, or acknowledge, that (1) dimensions of environmental risk can be inversely associated (e.g., a predictable but harsh environment), and (2) environments characterized as harsh or unpredictable are not hypothesized to be exclusively associated with fast life histories. Ellis et al. (2009) specify the conditions under which high environmental harshness and greater environmental unpredictability facilitate the adoption of either fast *or* slow life history strategies (pp. 218, 230). Whether environmental harshness or environmental unpredictability is associated with faster life history strategies is determined by age-specific rates of morbidity and mortality. Depending on whether external threats resulting from ecological factors exert greater influence on (or variation of) juvenile or adult morbidity and mortality rates, environmental harshness and unpredictability can facilitate faster or slower life histories. The CLASH model does not specify whether ecological conditions of temperature affect threats to juvenile or adult morbidity and mortality, or both. And neither does the CLASH model specify whether or how average temperature or variation in temperature differentially affect juvenile and adult morbidity and mortality.

Second, the CLASH model assumes that environmental harshness and environmental unpredictability exert similar and equal influence on specific life history outcomes over the life span. However, research has demonstrated that environmental harshness and unpredictability exert unique influence on life history outcomes at different developmental stages. For example, environmental unpredictability in childhood, but not environmental harshness, is uniquely associated with perpetration of intimate partner violence by both men and women (Barbaro & Shackelford 2016) and criminal behavior in young adulthood (Simpson et al. 2012). Other research has demonstrated that environmental harshness in adolescent years exerts unique influence on deviant behavior in adolescence, such as drug and alcohol use (Brumbach et al. 2009). Environmental harshness and environmental unpredictability may therefore uniquely predict aspects of life history strategies, including aggressive behavior, over the life span.

The CLASH model does not readily accommodate, or discuss, the possibility that the dimensions of environmental risk may

exert differential influence on the outcomes of interest. Conflating environmental harshness and environmental unpredictability into a single construct of environmental stress is not warranted, and may bias the results of research guided by the CLASH model. Ellis et al. (2009) detail the properties of environmental risk dimensions and note how each dimension is associated with external threats to morbidity and mortality at various stages of development. Life history theorists, moreover, have suggested that environmental harshness and unpredictability may not exert equal influence on life history strategies (Roff 2002), such that the effects of environmental unpredictability might be smaller than the effects of environmental harshness (Del Giudice et al. 2015).

Third, the construct of environmental unpredictability is not presented accurately in the target article. The authors assert that environmental unpredictability “refers to the uncertainty of future outcomes.” This definition is incorrect. Environmental unpredictability reflects the extent to which ecological factors produce variation in external morbidity and mortality threats (Ellis et al. 2009). Hypotheses derived from the CLASH model, therefore, rest on a faulty operationalization of environmental unpredictability.

The misunderstandings of life history theory embodied by the CLASH model, and the relationship between ecology and behavioral outcomes, are further evident in a primary proposition of the model. The authors suggest that greater seasonal variation in temperature should facilitate slower life history strategies, because seasonal variation necessitates that individuals “plan and prepare for the next season.” However, life history theory specifies how ecology influences external threats to morbidity and mortality (e.g., increased pathogen load in the environment), which then influence the adoption of life history strategies. Because the CLASH model does not specify which external morbidity and mortality threats are affected by temperature, it is not clear how temperature is hypothesized to impact human life history strategies. For instance, temperature variation might cause greater variation in *specific* sources of external morbidity and mortality in northern environments. During colder winter months, resource availability is lower. In the hotter summer months, pathogen load and disease prevalence are greater. Greater temperature variation, then, produces greater variation in particular external threats to morbidity and mortality. It could alternatively be argued that temperature variation could lead to fast, rather than slow life history strategies.

Rather than providing an “extension” of life history theory, the CLASH model for aggression is founded on misunderstandings of life history theory. The CLASH model incorrectly specifies how environmental harshness and environmental unpredictability exert influence on life history strategies. Future applications of the CLASH model should recognize that dimensions of environmental risk are, in fact, unique theoretical constructs.

Pragmatic propection emphasizes utility of predicting rather than mere predictability

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Abstract: Contrary to one assumption of CLASH, we suggest that colder rather than warm climates are the harsh, unpredictable ones, thus requiring greater self-control. We propose shifting emphasis from predictability to utility of prediction. Northern climates may be less predictable than tropical ones, making predictions and planning far